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REPORT

OF THE

SUDAN MEDICAL SERVICE

FOR THE YEAR

1942

BUREAU OF HYGIENE & TROPICAL DISEASES
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McCorquodale & Company (Sudan) Limited, Khartoum

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McCorquodale & Company (Sudan) Limited, Khartoum.

SUDAN MEDICAL SERVICE.

ANNUAL REPORT 1942.

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TROPICAL DISEAS

ANNUAL REPORT
OF THE SUDAN MEDICAL SERVICE
FOR THE YEAR 1942.

GENERAL HEALTH.

The state of public health in the Sudan as a whole was satisfactory throughout the year despite adverse conditions caused by the war. Relapsing fever was prevalent along the pilgrim route in Darfur, Kordofan and in particular the Gezira area of the Blue Nile Province. Heavy, badly spaced rains and a high Nile flood resulted in favourable conditions for mosquito breeding and the incidence of malaria was higher than average in the Northern Sudan during the last half of the year.

HEALTH OF OFFICIALS.

NATIONALITY.	Number of officials employed	Total		Average days Sickness		Died	Invalided.
		Placed on sick list	No. of days sick	For all officials	For those who were sick		
British	742	339	3,258	4.39	9.61	6	3
Sudanese	3,726	1,272	11,392	3.06	8.96	7	23
Egyptian	437	812	1,162	2.66	9.08	2	4

Lack of leave, overwork due to reduced civil cadres, and the strain of war, are having a cumulative adverse effect on the health of officials, particularly British officials in the Sudan. The comparative figures for the last five years are as follows :—

	1938	1939	1940	1941	1942
British					
Days sickness	2.22	1.95	3.21	4.27	4.39
Died	1	1	3	4	6
Invalided	2	4	5	5	3
Sudanese					
Days sickness	2.57	1.88	1.95	1.37	3.06
Died	6	7	5	7	7
Invalided	8	13	20	10	23
Egyptian					
Days sickness	1.91	1.73	1.82	1.79	2.66
Died	1	5	3	2	2
Invalided	3	3	6	5	4

EPIDEMIC DISEASES.

CEREBROSPINAL MENINGITIS.

2,787 cases were reported with 1,027 deaths.

The distribution in 1942 by Provinces was as follows :—

Province.	Cases.	Deaths.
Blue Nile	234	67
Darfur	504	204
Equatoria	969	280
Kassala	31	12
Khartoum	50	15
Kordofan	921	403
Northern	44	26
Upper Nile	34	20

The disease remained prevalent in Western Equatoria Province and there was an extensive outbreak in the Nuba Mountains area of Kordofan Province.

The incidence during the last ten years has been as follows :—

Year.	Cases.	Deaths.	Year.	Cases.	Deaths.
1933	166	131	1938	234	124
1934	4,231	3,341	1939	2,714	647
1935	3,249	2,154	1930	4,032	796
1936	13,440	8,906	1941	1,824	459
1937	446	293	1942	2,787	1,027

DIPHTHERIA.

207 cases were reported with 33 deaths.

The distribution in 1942 by Provinces was as follows :—

Province.	Cases.	Deaths.	Province.	Cases.	Deaths
Blue Nile	43	3	Khartoum	101	12
Darfur	6	1	Kordofan	36	12
Equatoria	—	—	Northern	12	2
Kassala	9	3	Upper Nile	—	—

Incidence during last ten years has been as follows :—

Year.	Cases.	Year.	Cases.
1933	51	1938	51
1934	34	1939	77
1935	60	1930	114
1936	63	1941	186
1937	36	1942	207

RELAPSING FEVER.

5.287 cases were reported with 559 deaths.

Cases were distributed among provinces in 1942 as follows :—

Province.	Cases.	Deaths.	Province.	Cases.	Deaths
Blue Nile	3,594	119	Khartoum	63	1
Darfur	1,350	412	Kordofan	194	20
Equatoria	34	3	Northern	2	—
Kassala	50	4	Upper Nile	—	—

Incidence during the last 9 years has been as follows :—

YEAR.	Cases.	Deaths.	YEAR.	Cases.	Deaths.
1934	1	—	1938	1,124	116
1935	—	—	1939	1,006	92
1936	22	—	1940	1,487	45
1937	374	48	1941	3,028	110
			1942	5,287	559

The incidence of this disease remains high in the irrigated areas of the Gezira in Blue Nile Province. It was also prevalent in Darfur and Kordofan Provinces. It remains largely restricted to the pilgrim route across the Sudan and is particularly prevalent among West Africans.

SMALLPOX.

12 cases were reported with no deaths.

Cases were distributed among Provinces as follows :—

Khartoum	1
Equatoria	9
Kassala	2

The incidence during the last 6 years has been as follows :—

YEAR.	Cases.	Deaths.
1937	425	57
1938	527	158
1939	553	103
1940	515	104
1941	46	—
1942	12	—

448,176 vaccinations were carried out in the Sudan during the year.

No deaths have been reported from this disease during the last two years partly owing to the extensive vaccination campaigns which have been carried out in the last six years, during which 3,686,358 persons were vaccinated with potent calflymph from the Stack Laboratories. These vaccination campaigns have now been extended to the Southern Sudan. One imported case was reported at Port Sudan from the Yeman via Asmara and Kassala. This disease has a grim record of death, disfigurement, and blindness from epidemics which have swept the Sudan throughout the ages and every effort must be made to maintain and improve the present acquired immunity to it. There are still pockets where vaccination is incomplete, particularly among women, and the Sudan is at present exposed to risk of infection from several adjacent countries. War conditions of course have considerably increased the risk of its introduction into and its spread in the Sudan.

The number of vaccinations carried out during the last six years has been as follows :—

YEAR.	
1937	561,197
1938	1,348,694
1939	580,052
1940	446,155
1941	302,084
1942	448,176

TYPHUS.

No cases reported.

YELLOW FEVER.

A confirmed case of yellow fever occurred at Torit during the year.

ENDEMIC DISEASES.

ANCYLOSTOMIASIS.

The incidence of this disease remains restricted to parts of Equatoria Province and a few small isolated foci in Northern Province.

BILHARZIASIS.

BLUE NILE PROVINCE: Gezira Irrigated Area.

The comparative figures for annual surveys and routine examinations of the inhabitants of the Gezira for the past ten years are as follows :—

Schistosoma Haematobium.

YEAR.	ADULTS.			CHILDREN.			TOTAL.		
	No. Exmd.	No. Inftd.	%	No. Exmd.	No. Inftd.	%	No. Exmd.	No. Inftd.	%
1933	14,188	28	0.20	3,288	27	0.82	17,476	55	0.31
1934	12,769	5	0.04	3,583	2	0.07	16,352	7	0.04
1935	13,902	8	0.06	2,945	12	0.40	16,847	20	0.12
1936	22,604	10	0.04	5,483	17	0.31	28,087	27	0.09
1937	30,768	26	0.08	10,038	63	0.62	40,806	89	0.22
1938	32,045	50	0.15	16,916	162	0.95	48,961	212	0.43
1939	17,044	30	0.17	10,877	174	1.50	27,921	204	0.73
1940	29,711	64	0.21	12,310	109	0.87	42,021	173	0.41
1941 ...	19,588	17	0.09	14,243	37	0.20	33,831	54	0.16
1942	24,888	90	0.30	10,460	115	1.08	35,348	205	0.50

This table shows a considerable increase in incidence in 1942 which is being investigated. Fortunately Schistosoma Haematobium is relatively mild in the Sudan. A much more worrying development is the evidence that Schistosoma Mansoni may be becoming endemic in the Gezira, particularly in the Northern part which has always been exposed to risk of infection from the large numbers of Arabs from infected areas of the White Nile district who migrate to the Gezira every year to pick cotton, and from West African immigrants.

The control of this disease is very difficult, as the examination required is often resented. Nevertheless, the problem must be tackled as Bilharzia Mansoni is a far more serious disease than Bilharzia Haematobium in the Sudan. A patient without treatment usually throws off Bilharzia Haematobium in adult life, while with Bilharzia Mansoni gets progressively worse.

White Nile Reservoir—Bilharzia Mansoni.

The figures for the White Nile Reservoir were as follows :—

District	Bilharzia haematobium		Bilharzia mansoni.	
	No. Exmd.	No. Inftd.	No. Exmd.	No. Inftd.
Dueim	755	45	944	38
Kosti	4,726	205	3,641	7

NORTHERN PROVINCE : Dongola and Merowe Districts : Bilharzia Haematobium.

The comparative figures for the last ten years are as follows :—

Year.	Number examined	Infections found.	Percentage	Year.	Number examined	Infections found.	Percentage
1933 ...	58,711	1,825	3.1	1938	44,517	891	2.0
1934	46,054	1,768	3.8	1939	40,194	1,054	2.6
1935	40,950	1,408	3.4	1940	35,205	1,107	3.1
1936	37,334	1,268	3.4	1941	28,982	838	2.9
1937	46,741	1,155	2.5	1942	30,698	1,275	4.1

Halfa : Wadi Halfa District : Bilharzia Haematobium.

The incidence of Bilgarziasis remains the same, and the disease appears to cause little disability in this district.

Year.	Number examined.	Infections found.	Percentage	Year.	Number examined.	Infections found.	Percentage
1934 ...	20,180	3,927	19.46	1938	21,958	2,763	12.5
1935	12,076	2,613	21.6	1939	18,319	2,422	13.1
1936	12,437	1,439	12.9	1940	16,064	2,435	15.1
1937	18,498	2,002	10.8	1941 ...	13,590	2,039	15.0
				1942 ...	13,453	1,785	13.3

BLACKWATER FEVER.

The incidence of this disease during the last ten years has been as follows :—

YEAR	Cases	Deaths	YEAR	Cases	Deaths
1933	38	12	1938	29	8
1934	34	9	1939	20	7
1935	18	9	1940	24	9
1936	38	14	1941	28	9
1937	20	5	1942	29	11

The nationalities affected were :—

	Cases	Deaths
Sudanese (Arab)	18	6
Sudanese (Negroid)	2	1
Abyssinians	1	—
Greek	—	—
European	4	1
Others	4	3

The following table shows the incidence by age and sex in the various areas:—

PROVINCE AND DISTRICT.	MALE		FEMALE		AGE GROUPS IN YEARS.					
	Cases	Deaths	Cases	Deaths	5–15	15-25	25-35	35-45	45-65	Age Un-known
BLUE NILE:										
Dueim	1	—	—	—	—	1	—	—	—	—
Kosti	1	—	—	—	—	1	—	—	—	—
Medani	3	3	—	—	1	—	1	1	—	—
Singa	2	—	—	—	1	—	—	—	1	—
Tayiba	1	—	—	—	—	—	—	1	—	—

Province and District.	Male		Female		Age Groups in years.					
	Cases	Deaths	Cases	Deaths	5-15	15-25	25-35	35-45	45-65	Age Un-known
b/f. ...	8	3	—	—	2	2	1	2	1	—
Equatoria.										
Juba	5	1	—	—	—	2	3	—	—	—
Western	—	—	1	1	—	—	1	—	—	—
Yambio	1	—	1	—	—	—	1	1	—	—
Eastern	1	—	—	—	—	—	—	1	—	—
Kassala.										
Gedaref	2	1	—	—	—	1	—	—	—	1
Kordofan :										
El Obeid	1	1	1	—	—	2	—	—	—	—
Dilling	1	1	—	—	—	—	1	—	—	—
Talodi	1	—	—	—	—	1	—	—	—	—
Nahud	2	1	—	—	1	—	1	—	—	—
Upper Nile.										
Bor	1	1	—	—	—	—	1	—	—	—
Tonga	—	—	1	—	—	—	1	—	—	—
Gambeila ...	1	—	—	—	—	—	1	—	—	—
Malakal	1	1	—	—	—	—	1	—	—	—
Total Cases ...	25	—	4	—	3	8	12	4	1	1
Total Deaths ...	—	10	—	1	1	1	5	1	—	1

DRACONTIASIS.

The incidence and distribution of this disease remain unchanged. It is prevalent in the Nuba Mountains, Bor District of Upper Nile Province, and in Equatoria Province.

DYSENTERY.

2,715 cases were admitted to hospital, of which 2,463 were diagnosed as amoebic and 252 as bacillary dysentery.

There was a decrease in the incidence of bacillary dysentery.

ENTERIC FEVER.

The distribution in 1942 by Provinces was as follows :—

Province.	Cases.	Deaths.	Province.	Cases.	Deaths.
Blue Nile	16	—	Khartoum	70	8
Darfur	—	—	Kordofan	2	1
Equatoria	10	—	Northern	45	7
Kassala	18	2	Upper Nile	6	—

There has been a marked diminution in incidence in Khartoum area during the last three years.

The incidence of this disease during the last ten years has been as follows:—

1933	204	1938	213
1934	188	1939	202
1935	246	1940	336
1936	135	1941	129
1937	165	1942	167

LEISHMANIASIS.

The incidence during the last ten years has been as follows:—

YEAR.	Cases.	YEAR.	Cases.
1933	202	1938	296
1934	289	1939	394
1935	171	1940	460
1936	214	1941	494
1937	336	1942	432

Kala-Azar.

410 cases were reported with 121 deaths. The figures for Blue Nile and Kordofan Provinces show a big decrease in cases as compared with last year, being 134 and 17 respectively in 1942 as against 234 and 56 respectively in 1941. The figures for Kassala show an increase, however, from 86 in 1941 to 156 in 1942. The incidence in the remaining provinces remains at almost the same level as last year.

KASSALA PROVINCE.

It was found necessary to evacuate Gallabat and move the population elsewhere owing to the very heavy incidence of Kala-Azar among officials and others in this station.

The town was the scene of heavy fighting in 1940 and large numbers of troops of many races were living under battle conditions for several months in its immediate vicinity. Possibly the sudden introduction of a large non-immune population exposed to exceptional risk of infection resulted in an increase in virulence of Kala-Azar in the station. Whatever the reason the station has been moved 25 miles distant from Gallabat as a temporary measure. It may be possible to return to Gallabat in a year or two as the disease may now die out according to previous experience in the Sudan.

DISTRIBUTION.

PROVINCE AND DISTRICT.	MALE		FEMALE		AGE GROUPS IN YEARS.						
	Cases	Deaths	Cases	Deaths	0-1	1-5	5-15	15-25	25-35	35-45	45-65
BLUE NILE.											
Gezira ...	1	—	—	—	—	—	1	—	—	—	—
Kosti ...	1	—	—	—	—	—	—	1	—	—	—
Sennar ...	13	5	1	—	—	1	3	8	—	1	1
S. Fung ...	11	5	6	3	—	—	6	8	2	1	—
Singa ...	81	23	8	1	—	—	11	29	34	9	6
Medani ...	12	3	—	—	—	—	—	7	4	1	—
DARFUR.											
Fasher ...	6	2	1	—	—	—	2	—	3	—	2
EQUATORIA.											
Juba ...	2	—	—	—	—	—	—	—	1	1	—
Kapoeta ...	23	2	6	—	—	4	14	7	4	—	—
Li Rangu ...	1	—	—	—	—	—	—	—	1	—	—
Yei... ...	3	—	1	—	—	—	1	1	1	1	—

DISTRIBUTION (*Contd.*)

PROVINCE AND DISTRICT.	MALE		FEMALE		AGE GROUPS IN YEARS.						
	Cases	Deaths	Cases	Deaths	0-1	1-5	5-15	15-25	25-35	35-45	45-65
KASSALA.											
Gedaref ...	105	23	28	12	1	12	29	38	36	14	3
Kassala ...	19	8	1	—	—	—	3	5	11	1	—
Port Sudan	3	1	—	—	—	—	—	2	1	—	—
KHARTOUM.											
Khartoum...	5	1	—	—	—	1	1	1	2	—	1
KORDOFAN.											
Talodi ...	3	2	—	—	—	—	1	1	1	—	—
Kadugli ...	6	5	—	—	—	—	—	1	4	1	—
El-Obeid ...	4	—	—	—	—	—	—	2	2	—	—
Dilling ...	4	2	—	—	—	—	—	1	2	1	—
NORTHERN.											
Atbara ...	2	2	—	—	—	—	—	1	1	—	—
UPPER NILE	31	14	22	7	—	2	12	23	14	1	1
TOTAL ...	336	98	74	23	1	19	84	136	124	32	14

RACE.

The races affected were :—

Sudanese (Arab)	241	Egyptians	1
Sudanese (Negroid)	181	Eritreans	—
Abyssinians	8	British	1

RESULTS OF TREATMENT.

	Apparently cured %	Died. %	Still under treatment %	Untreated or lost sight of %.
1937	37	17	28	18
1938	35.6	18.3	18.7	27.4
1939	42.1	26.4	21.1	10.4
1940	58.7	18.0	12.2	11.1
1941	47.4	28.9	11.1	12.6
1942	47.0	30.0	12.0	11.0

ESPUNDIA.

Three cases were reported, all from the Kordofan Province.

CUTANEOUS LEISHMANIASIS.

19 cases were reported all from Kadugli in the Nuba Mountains Province.

LEPROSY.

The following table shows the distribution of lepers in the Sudan :—

Province	Under treatment in camps or settlements.	Under observation and treatment as hospital or dispensary outpatients.	Total under treatment.	Under observation but not under treatment.	Total cases.
Blue Nile	43	14	57	26	83
Darfur	33	—	33	—	33
Equatoria	1,164	323	1,487	2,592	4,079
Kassala	19	—	19	—	19
Khartoum	—	30	30	—	30
Kordofan	98	8	106	1,937	2,043
Northern	43	3	46	1	47
Upper Nile	—	—	—	—	—
TOTAL	1,400	378	1,778	4,556	6,334

The incidence of this disease shows little change and it is considered that probably the best way of dealing with it is indirectly by educating the people not to expose themselves to risk of infection from lepers in their midst, and by raising the standard of living in every possible way including food, housing, sanitation, and personal cleanliness. The tribes of the Sudan vary very considerably in their attitude to leprosy ; some take adequate measures to protect the community while others treat the disease with complete indifference.

LI RANGU.

Dr. J. F. E. Bloss, Senior Medical Inspector, Li-Rangu reports as follows :—

" Only 86 new cases of leprosy were discovered during the year. This was the lowest number of new cases discovered for many years viz :—

1939	261
1940	241
1941	186
1942	86

" The total number of lepers in the district and their distribution, according to type are shewn in the following table :—

TYPE	Out Lepers	Settlement Lepers	Segregated Lepers	Total	New Cases	Admission to Settlement	Number under treatment
L1 ...	69	70	1	140	—	1	43
L2 ...	12	7	2	21	3	3	8
L3 ...	2	1	6	9	—	—	7
N1 ...	686	234	—	920	68	1	49
N2 ...	27	29	—	56	2	—	12
N3 ...	4	14	7	25	—	—	16
L1N1 ...	64	74	1	139	9	5	53
L1N2 ...	9	79	7	95	—	—	62
L1N3 ...	4	27	20	51	—	—	38
L2N1 ...	21	20	11	52	2	4	25
L2N2 ...	6	26	16	48	1	2	36
L2N3 ...	2	9	39	50	—	—	45
L3N1 ...	1	2	17	20	1	2	19
L3N2 ...	1	1	32	34	—	—	33
L3N3 ...	—	—	19	19	—	—	19
TOTAL	908	593	178	1679	86	18	465

" The total number of lepers in the district is estimated at about two thousand. This is considerably less than three or four years ago."

Dr. Bloss summarises the work of the year as follows :—

1. Leprosy work has continued on the same lines as last year. A further reduction in the number of cases is recorded.

2. The statistics shew that an increasing proportion of cases are mild neural cases, usually tuberculoid in character. This form of lesion is seen amongst those who have a fair resistance to the disease.

3. The absence of young children among the new cases is encouraging.

MALARIA.

14,963 cases were admitted to hospital with 97 deaths. Heavy, badly-spaced rains and a high Nile favoured the breeding of mosquitoes in the Northern Sudan and the incidence of malaria was higher than usual.

The following table shows the number of admissions to hospitals and deaths.

Province	Admissions	Deaths
Darfur	691	7
Equatoria	4,907	21
Blue Nile	3,495	19
Kassala	1,520	12
Khartoum	620	3
Kordofan	1,902	17
Northern	974	7
Upper Nile	854	11
TOTAL	14,963	97

The following table shows the spleen rate of children examined in the intermediate and village schools during the last five years.

Province or District	Percentage Spleen Rate.				
	1938	1939	1940	1941	1942
BLUE NILE PROVINCE					
Gezira Area	25.9	26.7	14.8	13.5	18.3
White Nile	44.7	32.5	17.7	20.0	36.0
Fung	50.3	46.4	35.8	41.4	41.9
DARFUR PROVINCE	50.1	45.2	36.4	38.4	35.9
EQUATORIA PROVINCE	22.6	28.0	23.6	34.4	43.2
KASSALA PROVINCE.					
Port Sudan	8.5	9.6	0.9	—	1.8
Kassala	22.7	19.5	47.2	18.4	20.5
KHARTOUM PROVINCE	2.5	6.6	3.5	1.5	1.4
KORDOFAN PROVINCE	44.1	37.9	32.7	32.2	24.1
NORTHERN PROVINCE	10.9	9.9	10.0	7.0	7.0
UPPER NILE PROVINCE	32.1	32.3	20.8	21.2	18.8

RABIES.

The number of persons receiving treatment during the past ten years has been as follows :—

YEAR.	Number of persons receiving treatment.	Deaths despite treatment.	Total. deaths.
1933	75	6	12
1934	198	6	8
1935	290	4	10
1936	373	1	8
1937	534	6	11
1938	557	1	8
1939	422	8	16
1940	352	1	3
1941	407	7	14
1942	396	1	11

All those treated had been actually bitten.

The following data are available as regards the fatal cases :—

Locality.	Age.	Sex.	Biting Animal.	Site of Bite.	Severity of Bite.	No. of days after bite when treatment was begun.	No. of Injections given.	No. of days from bite to fatal termination.
(a) THOSE TREATED								
KASSALA								
Gedaref	35	F	Dog	Face	Moderate	Same Day	14	21
(b) THOSE NOT TREATED								
BLUE NILE								
Sennar	15	M	Dog	Leg	Wound healed	—	—	30
Dueim	12	F	Dog	Leg	Mild	62	2	64
Southern	80	M	Dog	Leg	Slight	4	7	74
Meilig	35	M	Dog	Wrist	Fracture wounds	90	—	90
Managil	8	M	Dog	—	—	90	—	92
Massalamia	8	M	Dog	Leg	—	—	—	96
Wadi Nau	18	F	Dog	Forearm	—	—	—	43
Sulfat	50	M	Dog	Hand	—	—	—	35
KORDOFAN								
Nahud	7	M	Dog	—	—	—	—	15
KHARTOUM								
Eilafoun	40	M	Dog	Ear	Wound	26	1	27

ACUTE RHEUMATISM.

The incidence in the last six years has been as follows :—

YEAR	Cases	Deaths
1937	274	2
1938	292	4
1939	303	4
1940	223	3
1941	356	1
1942	136	—

The distribution of cases in 1942 was as follows :—

PROVINCE.	Cases.	PROVINCE.	Cases
Gezira	30	Khartoum	24
Darfur	3	Kordofan	4
Equatoria	2	Northern	26
Kassala	41	Upper Nile	6

SCURVY.

104 cases were reported with 2 deaths.

SLEEPING SICKNESS.

75 cases were reported in Equatoria Province compared with 125 in 1941. Of these 48 occurred in the eastern part of Zande district, 25 in the Meridi district, and 2 in Kajo Kaji sub-district.

The incidence during the last ten years has been as follows :—

YEAR.	Yubu	Yambio.	Yei.	Kajo-Kaji.	Meridi	Imported.
1933	70	12	1	—	—	—
1934	20	2	4	6	—	—
1935	80	—	1	10	—	—
1936	142	—	—	8	—	—
1937	63	1	2	23	—	—
1938	106	—	—	4	—	—
1939	103	—	—	6	—	—
1940	80	—	—	—	—	1
1941	69	—	—	1	47	8
1942	48	—	—	2	25	—

422, 902 palpations were carried out during the year and 4,270 gland punctures were performed.

Zande District.

46 cases of sleeping sickness were reported. This figure is the lowest recorded since 1934.

The tsetse fly control and the treatment of cases have continued on the same basis as last year with slight modification. The pass system between the Sudan and French Equatorial Africa and the Sudan and the Belgian Congo works satisfactorily.

Sleeping Sickness inspections continue to be conducted in many areas by the Chiefs assisted by local Medical Service laboratory staff. This arrangement works well, and has enabled the more senior Sudan Medical Service staff to cope with the extra work caused by war conditions.

Dr. Sayed Abdel Razig, Medical Inspector Source Yubu, reports as follows :-

" 242,066 palpations and 2493 gland punctures were performed during the year.

Courses of treatment are as follows :—

First Stage Cases : Six injections of Bayer 205 or Antrypol (1 gram) at three day intervals.

Second Stage Cases : Three injections of Bayer 205 or Antrypol at three day intervals followed by seven 3-gram injections of Trypanemide at weekly intervals.

The following table shows the results of treatment since 1937.

(A) First stage cases. Total number = 310.

YEAR	Bayer " 205 "				Antrypol			
	Hospital		Dispensary		Hospital		Dispensary	
	T	R	T	R	T	R	T	R
1937	43	14	8	4	—	—	—	—
1938	50	8	38	12	—	—	—	—
1939	22	7	24	4	4	—	18	6
1940	2	1	12	6	22	13	11	7
1941	—	—	9	2	29	13	1	1
1942	—	—	4	2	13	5	—	—
TOTAL	117	30	95	30	68	31	30	14
Age Relapses	26%		31%		45%		48%	

? percentage

N.B. T = Number treated. R = Number relapsed.

(B) Second stage cases. Number of cases = 260.

Type of cases	Group I					Group II				
	Completed period of observation					Still under observation				
	1937	1938	1939	Total	%	1940	1941	1942	Total	%
1. Original second stage cases	6	13	34	108		35	38	29	152	
2. Relapsed first stage cases	18	20	17			27	16	7		
3. Deserted or died ...	1	2	7	10		3	4	2	9	
4. Uneventful recoveries	21	29	43	93	95	54	47	34	135	94
5. Impaired vision due to tryparsam ...	2	2	1	5	5	3	5	—	8	6

N.B. The deserted and deaths have not been included in working out percentages.

N.B. Fly Catching : 76926 Tsetse Flies were caught during the year. The following table shows the results of the fly catching campaign to date :—

A General review of Sleeping Sickness since the introduction of the Block Systems.

?

YEAR.	Senior staff	No. of fly boys	No. fly caught	Average density per year	No. of S.S. cases.	Expenditure. £E. m/ms.	Cost of the fly m/ms.
1937 ...	—	38	20,045	11.6	46	23.790	1.13
1938 ...	2	58	33,956	12.76	60	172.000	5.06
1939 ...	2	101	23,064	4.96	51	59.585	2.6
1940 ...	3	245	79,021	7.01	37	303.630	4.82
1941 ...	2	311	122,543	8.56	19	378.770	3.1
1942 ...	3	220	76,926 *14,301	7.6	5	689.495	7.5

NOTE.—* Flies caught in Mungu area.

Dr. Sayed summarises his report as follows :—

1. The value of Tsetse fly control in sleeping sickness is again proved by a further reduction of cases in the Block scheme area. The number of cases from the areas covered by Blocks I and III has been reduced since 1937 from 60 cases to 3 this year.

2. That this is slow is due to the large area involved and the difficulty of adequate supervision.

3. The Yubu river area, adjoining French Equatorial Africa is comparatively safe from any new serious epidemic.

4. Staff have been taken from Yubu Block scheme to start a small scheme on the most dangerous point in Mungu area.

5. A survey of the result of treatment indicates prolonged courses for first stage cases.

6. The Native Administration continue to play the main part in all the administrative side of Sleeping Sickness satisfactorily.

Meridi District,

25 cases were reported compared with 47 in 1941. Of these 20 cases were found during the first six months of the year and 5 during the last six months.

The tsetse Fly control system has been extended.

19,369 flies were caught during the year.

The Meridi outbreak showed signs of spreading during the year. Effective steps were taken to deal with the situation however, and the epidemic as a whole is well under control. In the Eidi area there are already signs that it is dying out. The value of Tsetse Fly control in combatting Sleeping Sickness has been once more proved in this area.

Yei District.

In the area round Yei no cases have been reported since 1937 but two sporadic cases, and two cases imported from Uganda, were reported during the year at Kajo-Kaji in the eastern part of the District.

VENEREAL DISEASES.

The incidence of Syphilis remains high throughout the Sudan but some areas remain more or less free from Gonorrhoea. It is to be feared that one result of the war may be the infection of these areas by returning soldiers. Every possible step will be taken to prevent this. The great difficulty in dealing with syphilis is to persuade the patient to complete treatment, particularly at the rural dispensaries. The organisation of a campaign against this disease in certain areas is being considered to be commenced when conditions permit.

TUBERCULOSIS.

1,192 cases were admitted to hospital of whom 671 were pulmonary and 521 non-pulmonary. 15 of the pulmonary cases were foreigners and 5 were Sudanese who had contracted the disease in Egypt.

NATIONALITY.	Pul.	Non-Pul.	NATIONALITY.	Pul.	Non-Pul.
European	3	—	Hedjazian	1	—
Egyptians	2	—	Abyssinian	4	4
Yemeni	3	—	Somali	—	1
Indian	2	—			

It is considered that the prevention and treatment of this disease will be one of the most important public health problems in future, and it is hoped to provide more suitable facilities for treatment as soon as possible after the war.

The following table shows the admission for pulmonary and non-pulmonary tuberculosis in the last ten years :—

YEAR.	Pulmonary	Non-Pulmonary	Total
	Admissions	Admissions	Admissions
1933	521	394	915
1934	557	437	994
1935	501	371	872
1936	519	349	868
1937	488	395	883
1938	623	404	1,027
1939	685	396	1,081
1940	579	457	1,036
1941	631	511	1,142
1942	671	521	1,192

AGE INCIDENCE.

The following table shows the incidence of cases and deaths by age from pulmonary tuberculosis.

	0-1		1-5		5-15		15-25		25-35		35-45		45-65		65 and over		Total	
	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D
Northern Sudan	–	–	1	–	16	2	87	12	168	28	113	25	50	15	7	2	442	84
Southern Sudan	–	–	–	–	5	–	14	4	58	8	35	7	9	4	1	–	122	23

PULMONARY TUBERCULOSIS.

Comparative table showing the occupations of persons affected with Pulmonary Tuberculosis in the Northern Sudan during the last 8 years :—

	Cultivators.	Nomads.	Soldiers, Sailors and Police.	Day Labourers.	Townsmen			Indigent and un-employed.	Women not employed	Children.	Unclassified	TOTAL.
					Artisans & Shop-Keepers.	Clerical.	Servants.					
1935	113	15	9	43	94	—	—	51	87	3	—	415
1936	104	8	14	53	99	—	—	73	96	4	—	451
1937	117	5	19	73	47	26	12	72	107	10	—	488
1938	135	—	17	97	61	19	18	86	115	2	—	550
1939	164	—	13	72	46	11	28	111	108	10	—	563
1940	132	—	15	62	25	14	15	107	100	10	—	480
1941	182	10	32	92	28	16	11	80	141	40	—	631
1942	239	—	21	61	32	5	17	34	123	8	131	671

NON-PULMONARY TUBERCULOSIS.

Admissions for non-pulmonary tuberculosis were classified as follows :—

	Gland.	Bone	Joint	Other	TOTAL
Northern Sudan	127	111	104	117	459
Southern Sudan	26	24	1	11	62

Age groups were as follows :—

	0-1	1-5	5-15	15-25	25-35	35-45	45-65	65 & over
Northern Sudan	3	13	50	98	148	79	58	10
Southern Sudan	—	1	14	7	30	9	1	—

TUMOURS.

392 cases were admitted, classified as follows :—

Malignant	Carcinoma	120	
	Sarcoma	32	
	Unclassified	23	175
Benign			267
			442

The following table shows the admissions for malignant and non-malignant growths for the last five years :—

YEAR.	Malignant	Non-Malignant	TOTAL
NORTHERN SUDAN.			
1938	166	321	487
1939	219	411	630
1940	205	259	464
1941	221	264	485
1942	164	205	369
SOUTHERN SUDAN.			
1938	30	124	154
1939	17	82	99
1940	15	66	81
1941	34	61	95
1942	11	62	73

UNDULANT FEVER.

17 cases with 1 death were reported. The incidence during the last 10 years has been as follows :—

Year.	Cases.	Year	Cases.
1933	25	1938	28
1934	51	1939	29
1935	28	1940	43
1936	58	1941	31
1937	33	1942	17

PUBLIC HEALTH AND HYGIENE.

(By Lt.-Col. H. A. Crouch, O.B.E., M.C.)

GENERAL REMARKS.

Following three successive years of low Niles and light rains, the rainfall for 1942 was above average and there was a good Nile flood. Crops were generally abundant and grazing for animals satisfactory.

Owing to difficulties of supply and distribution there was acute shortage of grain in some areas. This was met by requisitioning and issues from Government reserves. The heavy cut in the sugar ration was taken remarkably well. Riverain areas under food cultivation were considerably extended and there was a considerable increase in fruit and vegetable production. No increased morbidity due to the lack of essential food stuffs was noticed.

Economic conditions were satisfactory. Demands for labour for war purposes continued on an increasing scale, money was plentiful and there was little unemployment.

The state of the public health has been on the whole satisfactory despite adverse conditions caused by the war.

The concentration and movement of large numbers of labourers within the Sudan resulted in the appearance of endemic disease in places hitherto free. In spite of the increased communication with neighbouring territories the incidence of epidemic disease was below average. Relapsing fever, however, was prevalent along the pilgrim route in Darfur, Kordofan, and in particular the Gezira area of the Blue Nile Province.

Sporadic cases of smallpox occurred but partly owing to the extensive vaccination campaigns carried out during the past six years, no deaths occurred and outbreaks were easily controlled. 448,176 vaccinations were carried out during the year.

A fatal case of yellow fever occurred in a European at Torit in Equatoria Province.

Heavy, badly spaced rains and a high Nile flood resulted in favourable conditions for mosquito breeding and the incidence of malaria was higher than average in the Northern Sudan during the second half of the year. Otherwise there was little change in the incidence of endemic disease.

Additions to the local population of military personnel, labourers and evacuees placed a heavy strain on public health staff. Delousing campaigns, and the supervision and control of sanitation in camps interfered to some extent with the normal activities of the service. Despite these additional commitments mosquito control has been extended, and progress in general sanitary improvement has been possible in most areas.

Water supplies in El Obeid, El Fasher and Port Sudan have been supplemented and have proved adequate in quantity and of a satisfactory standard of potability.

STAFF.

The number of British Public Health Inspectors was increased from 10 to 11.

Four candidates sat for the diploma of the Royal Sanitary Institute for public health officers. Two passed, one was referred for a year and one was not allowed to continue his studies.

Courses for sanitary overseers were held throughout the year. 10 candidates qualified in Khartoum.

The present establishment of public health staff in the Sudan provides one chief public health inspector, 10 senior public health inspectors, 16 Sudanese public health officers and 96 sanitary overseers.

YELLOW FEVER CONTROL.

The control of Aedes mosquitoes was continued on a larger and closer scale.

Additional staff was employed in all areas where the vector is present and the whole system of inspection, reporting and control was reorganised on a new basis. Specially trained aedes control units were formed in the provinces. These units check the findings of local mosquito staff and are in their turn visited by a headquarters control unit.

The whole organisation is under the supervision of the Medical Entomologist.

From the information provided it is now possible to assess accurately the prevalence of the vector in affected areas. The aedic index is found to be high in parts of Equatoria, the Nuba Mountains and the Red Sea Coast. With the exception of the latter areas, Aedes mosquitoes do not exist north of Khartoum.

The work of inspection and disinsectisation of aircraft has been continued in spite of the heavy increase in traffic. 10,504 inspections were made at the following airports :

Khartoum	1,020
Malakal	1,005
Juba	1,476
Geneina	2,930
Fasher	4,073

Adult mosquitoes were found on aircraft arriving at Khartoum on two occasions. The species were identified as Culex Fatigans in an aircraft from Asmara, Culex. T. uniforms in a flying boat from Port Bell.

THE HEALTH AND SANITATION OF PROVINCES.

KHARTOUM PROVINCE.

Area, 5,700 sq. miles — Population, 286,855.

GENERAL.

The prolonged and heavy rains led to a high incidence of malaria particularly in the rural district. No serious epidemic occurred.

Enteric fever showed a marked decrease. A small outbreak of chickenpox occurred in Khartoum City and an epidemic of measles in the rural district continued during the first six months of the year. There was a slight increase in notifications of cerebrospinal meningitis and relapsing fever was more prevalent than in the previous year. Dysentery figures were about average.

The Public Health Service maintained its high standard. Distinguished American visitors compared favourably the cleanliness of Omdurman with that of their larger cities.

Extensive work south of Khartoum and in the rural district in the destruction of heavy mosquito infections during the worst of the flood period undoubtedly avoided serious outbreaks of malaria.

Fly infestations were heavy after the onset of the rains and constant inspection of potential breeding places was necessary to abate the nuisance.

A drain to the river to remove waste water from the civil hospital and a numbe of adjacent public institutions proved a great boon.

A salvage service was set up and much material delivered to the Army authorities.

Slum clearance continued in Khartoum City and Khartoum North by moving the inhabitants of congested areas to native lodging sites and by the re-arranging of layouts.

VITAL STATISTICS.

POPULATION.

With the introduction of rationing it was possible to obtain a more accurate census of the population than in previous years. This year's figure showed an increase of 30,960 on the 1941 estimates.

BIRTHS AND DEATHS.

Registered births in the Three Towns were 5,464, deaths 3,363, an excess of births over deaths of 2,101.

The average death rate for the Three Towns was 16.2 per 1,000. Deaths under 60 were highest in the age group 1–5.

COMMUNICABLE DISEASES.

MALARIA.

As anticipated, an abnormally high river and prolonged rains resulted in a high incidence of malaria. This was most marked in the month of December. Flooding was so extensive in the rural district that despite all efforts it was impossible to control effectively mosquito breeding. Malignant tertian was the predominant infection.

ENTERIC FEVER.

There was a further drop in the number of cases notified. Only 37 cases, evenly distributed in the Three Towns, occurred as compared with 153 in 1941 and 278 in 1940.

CHICKENPOX.

There was a small epidemic of chickenpox during the early part of the year. The majority of the cases occurred in Khartoum City. There was one case of smallpox imported from the Gezira. 32,858 vaccinations were carried out.

MEASLES.

This disease occurred in epidemic form in the rural district during the first six months of the year.

DIPHTHERIA.

There was a slight increase in the number of cases as compared with 1941.

CEREBROSPINAL MENINGITIS.

Figures were much the same as for 1941 with the greatest number of cases during March. With the advent of the hot dry weather the disease died out.

RELAPSING FEVER.

In all 63 cases were notified. Mass delousing was carried out in the affected areas and the disease quickly brought under control.

RABIES.

One case of human rabies and 8 of canine rabies occurred during the year. Destruction of stray dogs was continued and in one persistent focus of infection total destruction of dogs was advised.

DYSENTERY.

154 cases of amoebic and 73 cases of bacillary dysentery were notified. These figures, of course, only represent a small proportion of the cases which actually occur, but they approximate those notified in previous years.

TUBERCULOSIS.

136 pulmonary and 18 non-pulmonary cases came to the notice of the public health authorities. There is little change as compared with last year. Approximately half these cases were locally contracted.

LEPROSY.

Seven cases were notified during the year, three of which were local.

PRISONS.

The health of prisoners was satisfactory. No epidemic occurred and there was no case of deficiency disease. Sanitation was satisfactory and judging by the general health and physique of prisoners the ration was adequate.

28 new cells were opened in the prison for the accommodation of violent mental cases. 4 mental cases were discharged and 17 admitted, 38 remaining under detention. Their general health was satisfactory.

SCHOOL MEDICAL INSPECTION.

13,250 pupils in 87 schools were examined during the year. There were sporadic cases of chickenpox, measles and whooping cough.

Trachoma still heads the list of defects found at inspections. In village schools over 70% of the children suffer from trachoma. There is a progressive decrease in the percentage of cases found in the higher grade schools. Treatment of all eye conditions is carried out under the supervision of the Assistant Ophthalmic Surgeon.

Dental defects numbered 1,980 mostly carious teeth requiring extraction.

Two cases of tuberculosis were discovered during inspections. 542 pupils were considered to be of subnormal physique, otherwise the general health and physical standard of school children inspected was satisfactory.

NORTHERN PROVINCE.

Area 236,200 Sq. M.—Population 594,805.

The rainfall for 1942 was above average and there was a good Nile flood. In contrast to the previous year crops were abundant and grazing for animals satisfactory.

During the summer, acute local shortages of grain occurred in many parts and considerable difficulty was experienced in obtaining supplies from outside the Province. A grain crisis was averted by requisitioning. Issues were made from Government reserves. No cases of deficiency disease were reported.

Economic conditions on the whole were satisfactory. In addition to the Government agricultural schemes many private pump schemes were started—all river basins were flooded and areas under cultivation for food were considerably extended. There has been an increase in fruit and vegetable production.

The community benefited from the rise in prices and the cultivator has probably never been better off.

A total of 292,875 new cases were treated at Province Hospitals and dispensaries. There was an increase in the number of admissions and a slight decrease in outpatient attendances.

Additions to the local population, of military personnel and civilian labourers employed on military work, led in some areas to an increase in the number of persons treated at civil hospitals. In the northern part of the Province eye diseases remained one of the chief causes of morbidity, treatment of which constituted the bulk of the work carried out at dispensaries. There was an absence of any serious epidemic. Minor outbreaks of measles, chickenpox and mumps occurred. Little change was noticed in the incidence of endemic disease. The incidence of malaria was low in all districts. 974 cases were admitted to hospital with 7 deaths compared with 1,124 cases and 5 deaths in 1941. Malaria in this Province is most prevalent during the months December—April. This period coincides with the falling river leaving pools which become heavily infected with anopheles. During the rainy season no increase in malaria was reported.

The anti-mosquito measures taken in the Debeira-Faras area were particularly successful in reducing the mosquito rate. The low incidence in the Halfa district is of interest in view of the reports of severe epidemic malaria with a high mortality in Egypt north of the border.

Trachoma remains very prevalent especially in the northern part of the Province. During the year, 35,422 cases were treated in hospitals and dispensaries. A field survey in the Merowe district showed 58% infected.

Urinary bilharzia is endemic throughout the Province, mansoni infections are confined to one area. There has been a gradual decrease in incidence during the past 13 years. 30,698 persons were examined during the year and 4.1% were found infected, which result compares favourably with a rate of 12.2% infected found in 1929.

Epidemic diarrhoea in children was one of the chief causes of mortality among infants and young children. No record of the actual number of cases is available. The highest incidence occurred during the months of July-September, when flies were reported to be prevalent in many areas.

Little extension of public health services was undertaken except in so far as was needed to meet military requirements. The standard of sanitation in the larger towns was maintained, though with difficulty, due to the limited supply of buckets and material for the repair of conservancy carts.

BLUE NILE (GEZIRA) PROVINCE.

Area 54,775 sq. miles—Population 1,464,966.

The incidence of malaria was heavy throughout the Province particularly in the Gezira and White Nile areas. A high Nile and heavy rains may account to some extent for the increased incidence over that of 1940 and 1941, both however were exceptionally good years. The control measures adopted were the same as in the past. Baling is still the most effective measure of control in the irrigated area.

Relapsing fever has now become endemic and widespread throughout the Province. Prophylactic delousing was initiated but made little progress as delousing units had to be diverted to the control of outbreaks of the disease. The problem has now become serious and complex. The population is largely a floating one and a very large percentage of the people are infested with lice. The density of infected lice has risen during recent years. Although outbreaks have not assumed epidemic proportions an increasing number of cases continue to occur over a wide area and the carrier rate must be high.

The incidence of the disease was greater in 1942 than 1941, in spite of the fact that more delousing units were operating and that the immigrant labour population was less by many thousands than that of average years. It is apparent that if the disease is to be stamped out delousing must be carried out continuously and simultaneously in all districts throughout the affected area. In the Northern Gezira attempts were made to persuade villagers to voluntarily delouse themselves, but these efforts met with limited success. The answer to the problem appears to lie in the provision of a large number of delousing units operating continuously in circumscribed areas.

Routine examinations for Schistosomiasis infections were carried out in dispensaries as in previous years. About 15% of "Westerners" applying for work in the Southern Gezira were found to be infected with urinary bilharzia. There is some evidence that the incidence of rectal bilharzia is increasing in the Northern Gezira. Amongst other difficulties encountered in controlling the disease are the examination of women and reluctance to complete a full course of treatment. Anti-snail measures include drying out, weeding and disinfection of canals. These measures could be usefully extended but difficulty lies in the provision of an alternative water supply. Wells must be dug very deep and even then the water is likely to be brackish.

There was an apparent increase in the incidence of non-pulmonary tuberculosis. Unbalanced diets and a state of subnutrition probably play a large part in rendering the inhabitants prone to the ravages of the disease.

A bad malarial year and the continued spread of relapsing fever has strained severely the resources of the Public Health staff. Lack of sufficient transport has added to their difficulties.

KASSALA PROVINCE.

Area 134,450 sq. miles—Population 459,446.

Two conditions affected adversely the public health of this Province during the year. The heavy rainfall and the abnormally high rise in the River Gash resulted in an outbreak of malaria which reached epidemic proportions in the Kassala area. The high proportion of immigrants returning to the Sudan from Eritrea, infected with venereal disease led to a local increase in incidence.

Sporadic cases of cerebrospinal meningitis caused a few deaths, and during the latter part of the year relapsing fever appeared in the Southern District. 74 cases were detected and entailed the quarantining and delousing of over 10,000 people. In Gedaref town a severe outbreak of amoebic dysentery started in May and disclosed the inadequacy of existing sanitation. Many more public latrines were constructed and all cattle were cleared out of the town. The epidemic died out in September when 483 cases had been treated in hospital. The test of the efficacy of the new measures will not be apparent until next summer.

Though it cannot be said that in Kassala medical work has yet returned to normal, progress in Gedaref, though much less affected by the war, has been marked and rapid.

PORT SUDAN.

Hospital admissions in Port Sudan at 4,663 and outpatients at 106,323 constituted new high record figures but were due to increase in population rather than to a greater incidence of sickness.

Endemic diseases have not exceeded the normal and there have been no epidemics. The incidence of dysentery both amoebic and bacillary continued at a high figure. There were 873 cases of amoebic and 254 of bacillary type. Incidence was fairly evenly distributed through the months of the year.

An outbreak of gastro-enteritis in children coincided with increased fly breeding during the last quarter of the year.

1,200 cases of tropic ulcer were treated. The majority occurred amongst destitute and lowly paid persons, suggesting that food deficiency played some part in the aetiology of the disease.

Climatic conditions have been average throughout the year.

Owing to the large influx of labourers for temporary employment at the Port, the food situation among the more lowly paid has at times been strained and cases of food deficiency occurred among them.

The danger of water shortage in the Port has been alleviated by the construction of two new reservoirs.

The Public Health Service of the town functioned well but was heavily handicapped by the shortage of motor transport. Owing to the greatly increased population, housing of all kinds was overcrowded.

The arrival of a consignment of sanitary fittings allowed a large increase in septic tanks. Installations and improvements were made to existing waste water disposal systems.

A large increase in the number of fly infections was noted during the period October to December.

Rat Control.

This was continued as in previous years. The following are the figures of rats caught during the past five years :—

1938	1939	1940	1941	1942
12,215	16,578	17,224	16,281	16,654

Rat Fleas.

The flea census per month together with the prevailing atmospheric conditions was as follows :—

MONTH.	Fleas per rat.	Average Temperature Shade		Average Relative Humidity.
		Maximum °C.	Minimum °C.	
				%
January	0.4	27.7	19.2	75
February	0.4	29.2	19.7	77
March	0.4	30.1	19.5	75
April	0.4	32.6	23.6	74
May	0.4	36.3	25.4	59
June	0.4	40.1	25.7	42
July	0.4	41.2	27.9	52
August	0.4	40.1	28.9	53
September	0.4	37.5	27.0	56
October	0.4	34.5	26.5	68
November	0.4	31.6	24.4	81
December	0.3	29.7	22.3	80

KORDOFAN PROVINCE.

Area, 146,930 sq. miles — Population, 1,289,749.

The general health of this Province has been only fair. The early months of the year saw a considerable outbreak of cerebrospinal meningitis in the Nuba area, there was a large increase in the incidence of malaria throughout the greater part of the Province and localised outbreaks of relapsing fever occurred in the Kadugli and Sherkeila districts.

Apart from malaria, syphilis remains one of the major medical problems of the Province.

There has been no case of yellow fever during the year.

The Province as a whole has been prosperous due to the big demand for cattle and sheep and to good prices for local commodities.

There was a big demand on man-power both for enlistment in the army and as general labourers.

Except in the Nuba area there was a general shortage of grain in the first half of the year owing to the poor rains in 1941, and in parts of the Province the Government had to import and distribute grain.

No case of deficiency disease was reported. The 1942 crop is reported to be excellent.

During the month of May and June there was a serious water shortage in El Obeid, but works put in hand should prevent this recurring.

A notable event was the passing over of the sanitation of El Obeid from the control of the District Commissioner to that of the Town Council. The change has proved a success.

Owing to increase of the local population and the influx of military personnel, labourers and evacuees, efficient supervision of public health work was carried out with difficulty, but on the whole essential services were well maintained.

DARFUR.

Area 138,150 sq. miles—Population 707,576.

The general health of the Province was affected by a shortage of food in the first half of the year and by a high incidence of malaria due to the heavy and closely spaced rainfall.

There were two minor epidemics. In the south west there were 660 cases of cerebrospinal meningitis with 252 deaths. Good results of treatment soon became known and cases were reported earlier than in previous outbreaks. Relapsing fever caused 932 deaths among the Fur but 520 of these occurred before quarantine and delousing stations could be established.

There were no cases of Rabies, 154 persons receiving prophylactic treatment. No cases of smallpox were reported, 121,421 persons were vaccinated bringing the whole number of vaccinated in the last four years to 595,580 out of a population of 707,576.

Syphilis is widespread and prolonged treatment unpopular. Gonorrhoea is chiefly confined to the few towns and larger villages of the province—rural dispensaries rarely report more than a dozen cases in a year.

The heavy rainfall caused an increase in malarial incidence and much extra work for the public health staff. Anti-aedes measures were continued and aircraft control strictly carried out.

Both admissions and outpatient attendances fell off at dispensaries as compared with 1941. This may be due partly to restrictions on movement imposed by quarantine regulations and partly to lack of food in the province.

The increase in in-patients at Fasher is explained by the heavy incidence of malaria and by a temporary increase in population.

On the whole in spite of poor general nutrition the health of the Province did not greatly deteriorate.

UPPER NILE.

Area 92,270 sq. miles—Population 534,712.

The general health of the people was good. With the exception of the Bor district, crops throughout the Province were adequate and there was no evidence of malnutrition.

Military establishments and the importation of northern labour resulted in a temporary increase in the local population which was reflected in rise in the incidence of certain diseases. The general health of this imported labour was fair, the chief problem being the control of malaria to which disease 'Northerners' are particularly susceptible. Of a total of some 1,000 employed, 490 or nearly 50% suffered from malaria. Following the use of suppressive treatment incidence declined. 232 cases of ankylostomiasis were treated of which number more than half occurred in northern labour.

Little change was noted in the incidence of other diseases common in this Province. Enteric fever has been endemic in Malakal for many years and a number of cases continue to occur annually. 6 cases were notified in 1942 as compared with 27 in the previous year. Additional public health measures to guard against spread of the disease were introduced during the year. T.A.B. inoculation was made a condition for the issue of licences to all food handlers and pit latrines were constructed in the native lodging area.

There is reason to believe that kala-azar is more widespread than hitherto supposed and the possibility that domestic animals provide a reservoir of infection is being enquired into. Spleen and liver smears of a dog from a house in which two cases had occurred were examined but proved negative.

Some improvement was effected in the general sanitation of Malakal town. Anti-mosquito measures were extended especially in the neighbourhood of the aerodrome.

EQUATORIA.

Area, 159,025 sq. miles—Population 1,263,045.

The total " recorded " medical work in hospitals and dispensaries of this Province reached about the same level as in 1941 with, however, some increase in Juba and Yei due to the presence of soldiers and labourers. Large bodies of men were moved into the Province from the Northern Sudan and many labourers were brought into Juba and Yei areas from other parts of Equatoria. All these men were examined and deloused prior to departure, but in spite of these precautions a fair variety of diseases including relapsing fever was found among the ' Northerners ' by the time they reached their destination.

In all the Province about 70,000 people were deloused, 120,000 vaccinated against smallpox, 35,000 inoculated with yellow fever and 12,000 with T.A.B. vaccine during the year.

There was no extensive epidemic. Cerebrospinal meningitis broke out in the Kajo-Kaji district and continued in the Wau and Rumbek areas. A few cases of smallpox were seen in the Rumbek district and a fatal case of yellow fever occurred in a European at Torit.

Northern immigrants suffered severely but not unexpectedly from malaria, though incidence among the local population was lower generally than in average years. It is of course the disease of first importance in Equatoria probably being the chief cause of the high infant mortality rate.

The venereal diseases were common in the western districts but little change was noted in the incidence of other endemic diseases.

Tropical ulcers, common throughout the Province, spread towards the end of the year among the Northern labour, causing much disability and loss of working time.

The sleeping sickness outbreak in the Meridi area was controlled and some successful experiments in fly eradications were devised and tried out there.

The sanitary condition of most stations showed improvement. Progress was made in the provision of latrines and special attention paid to mosquito protection in houses.

The control of aedes mosquitoes along lines of communication was attempted on a larger and closer scale.

Inspection and supervision of military and labour camps added considerably to the work of public health staff.

MATERNITY AND CHILD WELFARE.

16 midwives passed the qualifiying examination and were licensed to practise in the Sudan. 394 midwives have been trained since the school opened, of whom 309 are still in practice. 27 trained midwives attended refresher courses.

The distribution of midwives in the Provinces is as follows :—

Khartoum	79	Kordofan	40
Blue Nile	63	Darfur	10
Northern	88	Upper Nile	6
Kassala	23		

There are still a large number of licensed but untrained midwives in practice. This is inevitable until a sufficient number of trained midwives become available. It may be said that where a sufficiency of trained midwives is established, the untrained midwife tends to disappear.

MATERNAL MORTALITY.

It is only in the towns where the population is entirely served by trained midwives that it is possible to obtain reliable information regarding maternal mortality and the complications of child birth.

The midwives of Omdurman, attended 2100 (2084) cases of which 30 (20) were classed as abnormal. 91 (74) patients were transferred to hospital where 6 (4) died. There were no deaths in the district. Of a total of 2138 births, 2070 were born alive, 68 were still-born. There were 38 twin births.

110 (57) cases of abortion were treated by midwives of whom 39 (7) were transferred to hospital. There were no deaths.

The number of registered live births in Omdurman was 2138 (2059). The number of maternal deaths was 6 (14). Total maternal mortality rate (Omdurman) 2.8 (6.8) Infant mortality rate (Omdurman) 102.9 (70.7).

The following statistics are compiled from the records of cases treated in the hospitals of Khartoum, Khartoum North and Omdurman.

Total number of live births registered in the Three Towns was 5464 (4611).

Total cases attended in hospital was 501 (451).

(a) Normal	83 (57)	(d) Died	32 (14)
(b) Abnormal	418 (394)	(e) Live Births in hospital	201 (179)
(c) Recovered	469 (437)	(f) Still ,, ,, ,,	59

Complications and Causes of Death.

			Total.	Recovered.	Died.
Abortions	Septic	17 (9)	144 (146)	144 (144)	0 (2)
	Others	127 (137)			
Puerperal sepsis	Normal labour	53 (28)	97 (46)	84 (44)	13 (2)
	Abnormal labour	44 (18)			
Puerperal haemorrhage	Placenta praevia	10 (11)	47 (32)	40 (29)	7 (3)
	Other causes	37 (21)			
Puerperal albuminuria and convulsions			18 (16)	16 (15)	2 (1)
Other toxaemias of pregnancy			16 (9)	14 (9)	2 (0)
Phlegmasia alba dolens and Embolism			1 (2)	1 (2)	0 (0)
Other accidents and abnormal condition of the puerperal state			93 (77)	85 (71)	8 (6)
Illness complicating, but not directly due to pregnancy			98 (85)	91 (80)	7 (5)
			514 (413)	475 (394)	39 (19)

The figures in brackets are those recorded for 1941.

MATERNAL AND CHILD WELFARE CLINICS.

Ante-natal clinics.

19,793 attendances, of which 6693 were new cases were recorded at 16 centres in the towns of the Northern Sudan.

13,285 attendances including 4559 new cases were reported from the clinics in Khartoum, Khartoum North and Omdurman.

86% of the cases delivered at the Midwifery School had attended the ante-natal clinic; most of them paid several visits as well as being visited in their homes by the midwives.

In addition to the above, 768 cases attended the gynaecological clinic in Omdurman, of which number 265 were new cases.

The infant mortality rate for the Three Towns was as follows:—

Khartoum	88.5	per 1000 live births.
Khartoum North	48.5	,, ,, ,, ,,
Omdurman	102.9	,, ,, ,, ,,

(The low figure for Khartoum North is probably due to inaccurate registration.)

Child Welfare Centres and Home Visiting.

Progress continues in this most important branch of preventive medicine. The child welfare centre in Omdurman is increasingly popular. There were 1,835 attendances of which 467 attended for the first time. 10 mothers attended for test feeds. 4,530 families were visited in their homes during the last 6 months of the year. Of these 1,591 were first visits and 2,939 were revisits.

At the women's dispensary in Wad Medani there were 64,570 attendances, the great majority being children suffering from malaria, conjunctivitis and dysentery.

SCHOOL MEDICAL SERVICE.

49,196 pupils were examined in 404 schools as compared with 50,834 in 575 schools in 1941.

Some modification has been made in the number of examinations carried out and the interval between them. With existing staff it is only possible to examine anually a proportion of the schools, the remainder, particularly village and sub-grade schools, being neglected.

It is considered more important to examine all pupils once or twice in each grade of school than to examine a proportion annually and the remainder not at all and further it is obvious that control of treatment is more important than repeated inspection of the healthy.

In Khartoum 13,250 boys and girls were examined as compared with 12,070 in the previous year.

Periodic inspections of school children and school buildings are made by Medical Inspectors of Provinces. Medical Officers and Medical Assistants carry out routine examination and treatment. In Khartoum a whole time Medical Inspector is now employed on school work while inspection and care of the teeth is carried out by a qualified dental surgeon. The Assistant Ophthalmic Surgeon visits most of the schools in Khartoum and advises on the course of treatment for every boy and girl with trachoma. Specially trained school dressers carry out the treatment recommended.

A recent analysis of results of medical inspections in Khartoum schools over a period of years showed that the following percentage of those examined required treatment—newly-joined 70%, 1st year 50%, 2nd year 40%, 3rd year 30%. On admission to the higher schools it is found that about 30% require treatment, of which trachoma provides 20% of cases, of the remaining 80% the most common diseases are defective vision, carious teeth, enlarged tonsils, hepatitis and albuminuria.

Of the defects found at school medical inspections in the Northern Sudan, trachoma is by far the most frequent. The percentage affected varies from some 70% in the village schools to 14% in the higher schools. In Khartoum, 1980 dental defects were found in 13,250 pupils examined. Enlarged liver and albuminuria appear to occur far more frequently in girls than boys.

The incidence of urinary bilharzia continues high in Darfur, Kordofan and the Halfa district of the Northern Province, but infected children rarely complain of symptoms and the disease tends to die out in adult life.

In the Southern Sudan the chief diseases encountered are splenic enlargement and malaria, dental defects, skin and intestinal diseases. Rectal bilharzia and ankylostomiasis are common infections.

In both the Northern and Southern Sudan attention has been paid to better living conditions of pupils. Standard regulations, governing the size of class rooms and dormitories and the provision of latrine accommodation and water supplies, were drawn up during the year.

The importance of education in hygiene in schools was stressed and instructions issued as to the routine measures to be taken to maintain a satisfactory standard of hygiene.

The following table shows the results of medical examination :

PROVINCE AND DISTRICT	No. Exam.	% Tracho-ma	% Bilhar-zia	% Spleen	% Pulm T.B.	% Ancy-lost.	% Other Disease
Blue Nile Province :—							
GEZIRA AREA.							
2 Intermediate	293	13.7	0.3	11.6	—	—	—
14 Elementary	2427	28.9	0.6	13.6	—	—	—
60 Village Schools ...	3130	26.4	2.1	25.7	—	—	—
9 Girls Schools ...	731	31.9	—	6.3	—	—	—
WHITE NILE AREA.							
1 Teachers Trg. Sch. ...	111	26.1	6.3	14.4	—	—	—
1 Girls School	104	26.9	—	5.8	—	—	—
11 Elementary	1097	25.3	2.4	39.0	—	—	—
12 Village Schools ...	763	30.9	8.3	44.4	—	—	—
1 Intermediate Rural School	146	16.4	1.4	13.7	—	—	—
FUNG AREA.							
5 Elementary	769	26.1	1.02	45.5	—	—	—
9 Village Schools ...	645	35.03	7.6	46.04	—	—	—
2 Girls Schools ...	241	43.2	1.2	19.1	—	—	—
Darfur Province :—							
6 Fasher District ...	810	39.3	31.0	28.5	—	—	3.7
1 Geneina District ...	109	27.4	11.9	12.8	—	—	—
1 Nyala District ...	233	62.7	23.2	70.8	—	—	—
Equatoria Province :—							
Juba 2 Mission Schs. ...	171	2.9	1.8	41.5	—	11.1	—
Wau 9 Element. Schs. ...	1133	2.2	13.5	52.8	—	12.7	20.1
Rangu 6 Element. Schs.	324	—	18.5	31.5	—	33.3	40.7
Rumbek 1 Element. Sch.	77	1.3	1.3	51.9	1.3	32.5	2.6
Yubu 2 Mission Schs. ...	326	—	14.7	20.9	—	12.0	—
Meridi 3 Mission Schs. ...	95	2.1	51.6	23.2	—	8.4	52.6
Yei 1 Interm. Sch. ...	88	22.7	5.7	50.0	—	8.0	15.9
Yei 2 Element. Schs. ...	148	18.9	17.6	36.1	—	7.43	22.3
Torit 1 Interm. Sch. ...	34	2.9	—	50.0	—	—	—
Torit 4 Element. Schs. ...	560	10.4	1.3	17.9	—	9.3	—
Kapoeta 1 Element. Sch.	67	58.3	—	71.6	—	—	—
Lui 1 Mission School ...	98	3.1	—	10.2	—	31.6	—
Kassala Province :—							
6 Kassala	234	29.1	—	20.5	—	—	—
Gedaref 6 Elem. Schs. ...	510	48.6	—	35.9	—	—	—
Port Sudan 1 Interm. ...	156	17.3	—	1.3	—	—	1.3
Port Sudan 1 Element. ...	236	9.7	0.4	2.1	—	—	—
Khartoum Province :—							
Gordon College	534	42.5	—	1.1	—	—	—
Higher Schools	145	37.2	—	—	0.7	0.7	—
Coptic College (Boys) ...	525	18.5	—	0.2	—	—	—
Omdurman Tech. School	132	45.5	—	0.8	—	0.8	—
Piastre Orphanage ...	60	30.3	—	1.7	—	—	—
Boys Intermediate ...	1740	43.2	—	1.7	—	—	—
Girls Intermediate ...	1722	19.0	—	—	—	—	—
Boys Elementary ...	533	58.4	0.01	2.2	—	—	—
Girls Elementary ...	2140	34.8	—	0.5	—	—	—
Khalwas	5030	72.0	—	6.02	—	—	—

PROVINCE AND DISTRICT	No. Exam.	% Trachoma	% Bilharzia	% Spleen	% Pulm T.B.	% Ancylost.	% Other Disease
Kordofan Province :—							
CENTRAL DISTRICT							
1 Intermediate ...	141	7.0	4.2	24.1	—	—	—
2 Element. Boys Schs.	399	23.5	1.0	9.0	—	—	—
1 Element. Girls Sch.	109	11.9	—	6.4	—	—	—
1 Sub-Grade Schools ...	124	33.8	—	8.0	—	—	—
EASTERN KORDOFAN.							
2 Elementary Schools	373	9.9	16.3	19.0	—	—	—
1 Girls Element School	120	7.5	—	10.4	—	—	—
3 Sub-Grades Schools	188	13.8	11.1	25.5	—	—	—
NORTHERN KORDOFAN.							
2 Boys Elementary Schs.	287	5.9	0.3	21.9	—	—	—
1 Girls Element Sch.	94	13.7	—	9.5	—	—	—
WESTERN KORDOFAN.							
5 Boys Element. Schs.	606	26.0	20.6	60.2	—	—	—
1 Girls Element. Sch.	112	21.4	2.6	37.5	—	—	—
8 Sub-Grade Schools	334	12.2	10.7	64.3	—	—	—
EASTERN JEBELS.							
4 Element. Schools ...	432	4.6	36.8	54.6	—	—	—
1 Girls Element School	78	15.3	24.6	80.0	—	—	—
5 Sub-Grade Schools	279	12.1	27.5	54.8	—	—	—
WESTERN JEBELS.							
3 Elementary Schools	365	1.6	3.4	33.9	—	—	—
1 Sub-Grade School ...	57	8.7	47.3	50.8	—	—	—
Northern Province :—							
ATBARA DISTRICT.							
2 Intermed. Schools	279	21.9	7.2	0.7	—	—	—
17 Elementary Schools	2267	32.3	6.4	8.6	—	0.1	—
52 Village Schools ...	2277	40.8	2.4	7.9	—	—	—
SHENDI DISTRICT.							
3 Elementary Schools	496	28.8	1.6	2.6	—	0.6	—
3 Village Schools ...	130	37.7	1.5	—	—	—	—
HALFA DISTRICT.							
1 Intermediate Sch.	149	50.3	15.4	4.02	—	—	—
12 Elementary Schools	1530	48.5	5.5	2.02	—	0.3	—
38 Village Schools ...	1444	41.6	29.6	13.1	—	4.2	—
MEROWE AND DONGOLA.							
11 Elementary Schools	1370	51.2	6.8	8.2	—	0.07	—
25 Village Schools ...	1481	54.5	2.2	12.0	—	—	—
Upper Nile Province :—							
MALAKAL.							
1 Elementary School	140	—	3.7	13.6	—	—	13.6
5 Mission Schools ...	306	—	21.2	—	—	—	24.8

QUARANTINE.

PORT SUDAN QUARANTINE.

The health of the Port remained satisfactory throughout the year. Abnormal demands for labour continued and there was a large influx of labourers from all parts of the Sudan.

One case of smallpox was imported from Kassala and public vaccination vigorously carried out.

Cases of smallpox were reported in Bombay. A ship arriving from that port was placed under observation and the crew vaccinated.

Pneumonic plague occurred in Port Said and restrictions on arrivals were imposed.

In August a ship landed a case of suspected cholera. The ship was placed in quarantine and later released on receipt of a negative laboratory result. No other cases of infectious disease occurred on ships visiting the Port.

SUAKIN PILGRIM QUARANTINE.

The 1942-43 pilgrimage was again a large one though less than that of the previous season. 7670 pilgrims left Suakin for Jeddah as compared with 8467 in the previous year.

The figures for pilgrims who have sailed from Suakin during the last 12 years are as follows :—

1931 ...	... 2,414	1935 ...	... 1,672	1939 ...	... 5,523
1932 ...	... 1,348	1936 ...	... 3,404	1940 ...	... 3,204
1933 ...	... 970	1937 ...	... 6,346	1940/41	... 2,085
1934 ...	... 1,459	1938 ...	... 8,159	1941/42	... 8,467

All pilgrims were vaccinated against smallpox and inoculated against cholera before departure from Suakin with calf lymph and cholera vaccine prepared in the Stack Laboratories.

Pilgrims paid in advance their return steamer fare and the quarantine charges in Arabia Saudia.

A Medical mission consisting of a Sudanese medical officer and a medical assistant accompanied the pilgrimage.

The health of the pilgrims returning from the 1941/42 pilgrimage was satisfactory. 12 cases of lobar pneumonic were admitted to hospital. Among the infectious diseases were 12 cases of chickenpox, 36 of measles and one case of modified smallpox.

The quarantine period was fixed at 8 days for those showing evidence of recent successful vaccination. The remainder were revaccinated. Those producing evidence of successful vaccination were released after 8 days, the remainder were detained for a total period of 14 days. Later the quarantine period was reduced to 24 hours for those showing evidence of recent successful vaccination, the remainder being treated as above. Vaccination results were generally good.

WADI HALFA QUARANTINE.

2524 Egyptian labourers passed through the quarantine.

134 were rejected and 529 were treated for bilharzia either at Wadi Halfa or at their destination.

OPHTHALMIC REPORT.

By Mr. A. R. McKelvie.

The Eye Department at Khartoum contains 110 beds of which 66 beds are provided for male and the remainder 44 are for female.

The following figures summarise the work carried out during the past four years.

	Khartoum Eye Hospital	Omdurman Eye Hospital	Total
Inpatients.			
1939	693	146	839
1940	582	112	694
1941	651	102	753
1942	882	—	882
Outpatients.			
1939	44,230	29,811	74,041
1940	52,918	31,416	84,334
1941	78,965	30,361	109,326
1942	82,531	—	82,531
New Cases			
1939	9,391	8,511	17,902
1940	10,341	11,158	21,499
1941	12,245	12,479	24,724
1942	14,033	—	14,033
Operations.			
Major.			
1939	549	125	674
1940	408	90	498
1941	565	112	677
1942	827	—	827
Minor.			
1939	292	10	302
1940	307	15	322
1941	580	30	610
1942	421	—	421

Owing to pressure of work in Khartoum and shortage of staff the Omdurman Eye Clinic was closed.

REPORT ON THE
STACK MEDICAL RESEARCH LABORATORIES
FOR THE YEAR 1942.

By Dr. E. S. Horgan.

RESEARCH.

The termination of hostilities on the Eastern Frontier has permitted a resumption of some of the interrupted research activities on kala-azar and yellow fever. In connection with the epidemiology of yellow fever it has been possible to complete an immunity survey in the Fung Province along the upper stretches of the Blue Nile. In addition a considerable amount of experimental work has been carried out on the relation of Vaccinia and Sheep Pox Viruses in conjunction with the Senior Veterinary Research Officer. A summary of these and other investigations will be found under the appropriate headings.

ROUTINE AND EDUCATIONAL ACTIVITIES.

A summary of the routine examinations is appended to this report; the total number of examinations was 20,196 as compared to 30,385 in 1941. This total does not include a large number of food examinations chiefly of canned food stuffs carried out for the military authorities. Reference to this work which is of a confidential nature has been made in the 1941 Report.

The considerable decrease in the total has been largely due to a decrease in number of Kahn Tests. During the year, the supply of standard antigen obtained from England was exhausted and it proved impossible to obtain further supplies from either England or the U.S.A.

Numerous attempts were made to prepare the antigen from local heart muscle (both sheep and ox) but for reasons as yet unexplained all these antigens were over sensitive and hence useless for routine work. Further trials with varying proportions of antigen and cholesteroal—the latter recrystallized by the Government Analyst—were equally unsatisfactory and attempts to prepare antigen had to be abandoned. Certain batches of antigen purchased from South Africa also gave very irregular results. Thanks however to the kindness of the Director, Pathology, Middle East Forces (Colonel J. K. S. Boyd) a reasonable supply of a standardized antigen was made available and all hospitals were informed that the Kahn Test had to be confined to sera in which a serological diagnosis was essential to the diagnosis or treatment of syphilis.

It was mentioned in the 1941 Report that Field's Stain was adopted as a routine. Owing to the depletion of reserve stocks of methyl alcohol and the difficulty of obtaining fresh supplies, this stain has now completely superseded Leishman's for the examination of all blood films for malaria, relapsing fever, and trypanosomiasis, as it was found that excellent results were obtained in the examination of blood films for both these latter types of organisms. The stain is not so satisfactory for Leishmania parasites in kala-azar cases and Leishman's (or Giemsa's Stain) is still issued for these as well as for differential counts and cases of anaemia.

As the supply of Brilliant Cresyl Blue was very limited, Field's second stain, using methylene blue instead of cresyl blue was recommended by him (1941 Trans. R. Soc. Trop. Med. Hyg. Vol. 35 p. 35) was adopted with equally satisfactory results and is now issued as the routine stain to all hospitals. The use of eosin as a counter stain was found unnecessary.

4 more Sudanese Laboratory Assistants were trained and passed their examination, the total now being 33, of whom one is still seconded to the Sudan Defence Force. During the year the majority were brought in to the Stack Laboratories for short courses of instruction in Field's Stain. It has been found that they quickly acquire the technique and, after a few days practice, become quite proficient in its use.

The number of hospital laboratories (26) remains unchanged.

ROUTINE.

PATHOLOGICAL SPECIMENS.

The total was 490 (excluding brains for rabies).

POST MORTEM EXAMINATION.

22 were carried out in Khartoum Civil Hospital including 8 medico-legal requested by the police.

There is nothing to add to the remarks made in previous reports on a very unsatisfactory situation as regards the practical instruction of medical students.

NEOPLASMS.

234 were received of which 120 were malignant including 7 melanomata ; of these 4 were in the usual situation on the sole of the foot. The tumours of the testis although histologically small round celled sarcomata were undoubtedly teratomata.

The thyroid tumour in the frontal region was an interesting example of the very rare condition, usually but erroneously called Benign Metastasizing Struma.

At operation the tumour which was about the size of a tennis ball, and had eroded the frontal bone was found arising from the dura.

Examination of the patient, a woman of 50, detected a small hard lump in the thyroid gland but, as the patient stated, it had been there for many years without an increase in size, its relation to the frontal tumour is obscure.

SITE.	Carcinoma.	Sarcoma.	Endothelioma	Melanoma.	TOTAL
Breast	16	2	—	—	18
Female External Genitals	3	2	—	—	5
Uterus	4	1	—	—	5
Ovary	3	1	—	—	4
Cervix	1	—	—	—	1
Penis	2	—	—	—	2
Testicle	—	2	—	—	2
Prostate	2	—	—	—	2
Bladder	5	—	—	—	5
Anus	3	—	—	—	3
Abdomen (site unknown)	4	3	—	—	7
Thyroid	1	—	—	—	1
Lymphatic glands ...	5	5	—	—	10
Eye and Orbit ...	3	6	—	2	11
Face	4	—	—	—	4
Lip and Mouth ...	1	—	—	—	1
Neck	1	3	—	—	4
Arm and Hand ...	1	—	1	1	3
Scalp	1	—	—	—	1
Jaw	1	2	—	—	3
Buttock	3	—	—	—	3
Leg	7	1	1	—	9
Foot	1	—	—	4	5
Chest	1	—	—	—	1
Site not stated ...	8	1	1	—	10
TOTAL	81	29	3	7	120

RABIES.

188 brains were received of which 4 were decomposed and useless for sectioning,

51 were positive for Negri bodies ; the distribution being 47 dogs, 2 goats, 1 calf and 1 donkey.

Rabies Vaccine—46,875 c.cms. were issued.

KALA-AZAR.

In the resumed investigations chemotherapy claimed priority, since with the more general use of 4.4 diamidino stilbene for the treatment of kala-azar, complaints about the toxic reactions, noted in last year's report, became more frequent. In the first place an enquiry was instituted to trace the subsequent history of the cases in the original series treated with aromatic diamidines in 1939 and 1940. The results of the enquiry which have been published in detail (Kirk and Sati, 1943 Ann. Trop. Med. Parasitol, in the press) indicate that in this series no important toxic effects have occurred, and the final results of treatment are satisfactory.

With the collaboration of the Government Analyst, a series of chemical and biological enquiries was next undertaken to elucidate the mechanism of the toxic action. A simple method of estimating the drug in biological fluids was evolved, by which the rate of excretion or possible storage in various organs could be studied. An account of this work has also been published (Henry and Grindley 1943. Ann. Trop. Med. Parasitol, in the press). It was found that only about 10 per cent of the drug is excreted in the urine after injection, thus indicating considerable cumulative retention in the course of treatment. Another factor, however, was found to be of greater importance, namely the decomposition of the drug in solution. It has been found that unless the solution is freshly prepared immediately before infection on each occasion, hydrolysis may occur, with the liberation of ammonium chloride and the formation of various new compounds, some of which are toxic. Apparently, however, hydrolysis does not always occur and the reasons why it should occur in some instances and not in others are still obscure. Clinical observations and toxicity tests in animals have shown beyond any doubt that increased toxicity, particularly for the liver and kindney, is associated with the use of solutions not freshly prepared. Some of the products of hydrolysis have been separated by fractional crystallisation, but the toxic fraction has not yet been identified as it is apparently one of the more soluble compounds, and remains in the solution.

GLANDULAR FEVER.

From time to time suspicious clinical cases have occurred in the Sudan but as none of these gave a positive heterophile agglutination test (Paul-Bunnell), the diagnosis could not be serologically confirmed. It is therefore of interest to record the first proved case in the Sudan. The patient, an officer in the Royal Air Force, exhibited the typical clinical syndrome and the characteristic blood changes. During the second week of illness, the Paul-Bunnell test was positive to a titre of 1 in 2048. During the year another patient—a British official in Khartoum—developed symptoms and a blood picture very suggestive of glandular fever but the Paul-Bunnel test on several occasions including convalescence never showed a titre higher than 1 in 64, which is not usually considered as significant. From a perusal of the literature, there is, however, a considerable difference of opinion among workers both as to the range of normal variation and whether the normal range is the same in different communities. There is also the question, are samples of sheep erythrocytes from different animals and breeds, of constant sensitivity. It was therefore thought desirable to carry out a survey and obtain some data on the frequency distribution of heterophile agglutination titres of normal sera in the Sudan.

Survey—1000 specimens of sera were received from all parts of the country in order to obtain as representative a series as possible. The agglutination tests were carried out according to the method of Paul and Bannel (1932 Amer. J. Med. Sci. Vol. 183 p. 98). Results were as follows :—

Percentage.	Titre
69.9	0
10.5	1 in 8
12.0	1 in 16
5.2	1 in 32
2.0	1 in 64
0.4	1 in 128

Enquiries were made into the histories of the four persons whose sera reacted at a titre of 1 in 128. One could not be traced from an analysis of the results it would appear that the normal titres in the Sudan are comparable with those recorded by recent workers in other countries as it is generally agreed that 1 in 64 (or 1 in 80) depending on the initial dilutions, can, for practical purposes, be accepted as the upper limit of the normal threshold. Further, no differences could be detected between different batches of sheep erythrocytes prepared from different sheep.

BACILLARY DYSENTERY.

In the 1941 Report it was mentioned that preliminary trials with Leifson's Desoxycholate Medium had given favourable results. Further work confirmed these results and early in 1942 this medium was adopted as routine for the examination of faeces from cases of bacillary dysentery.

A trial was also made of Wilson and Blair's Rosolic Acid Medium which has been recently advocated by some workers in Great Britain. The results were very unfavourable, as various types of coliform organisms commonly encountered in the Sudan but apparently rare in England, produced colonies identical with those of the Flexner group. In addition the medium was found to inhibit several dysentery types as Sonne, Shiga and some of Boyd's types. Further trials with this medium were considered useless.

Diagnosis.

During 1942, trials were made with rectal swabs as first advocated by Cruickshank and Swyer (Lancet 1940 ii. 803) for cases of Sonne dysentery. In conjunction with the Senior Physician, Khartoum Hospital, rectal swabs and fresh specimens of faeces from a series of patients with acute dysentery were plated out in parallel on Leifson's Medium. The results were remarkable and fully confirm the findings of the above authors. Out of 17 swabs, all were positive while the specimens of faeces from the same patients plated out in the Laboratory within a very short interval of being passed gave only 6 positives. In no case was a stool positive when the corresponding swab was negative. The cases included 2 Flexner, 2 Sonne, 1 B. ambiguum and 12 Shiga and the method appears to give equally satisfactory results with any type of bacillary dysentery.

The rectal swab has now been adopted as the routine method for diagnosis of bacillary dysentery in Khartoum Civil Hospital. The swabs are kept moist in tubes with a little saline agar as recommended by Cruickshank and Swyer, but, owing to the very low average humidity in Khartoum, it has been found advantageous to use corks instead of cotton wool plugs in the tubes and to store them at refrigerator temperatures (0° to 4° C.) until required for use.

Types of dysentery bacilli.

As usual the Flexner group accounted for the largest number of cases but Sonne and Shiga types both showed remarkable increases over the 1941 figures, the numbers being 51 Sonne and 56 Shiga compared to 7 and 18 respectively. There is no particular reason to account for this increase, which appears to be due in part to the improved diagnostic methods mentioned above.

Boyd types were isolated in 8 cases, of which 4 were Type DI and in addition there were 3 mannitol fermenters, inaggultionable with any of the stock sera.

VACCINIA.

Research. (1) Relation of Sheep Pox and Vaccinia Virus.

No sheep pox had been recorded from the Sudan for many years until the commencement of 1942 when several cases were detected amongst sheep intended for export to Egypt. As the possibility of an epixootic had to be borne in mind and, as it is essential to maintain an uninterrupted export traffic, the question of prophylactic vaccination with faccine lymph was considered. Experimental work on an extensive scale was carried out conjointly with the Senior Veterinary Research Officer (Dr. S. C. J. Bennett). The results are of more interest to Veterinary than Medical Pathology and are outside the scope of this report. It may be mentioned however that definite proof was obtained of the complete failure of vaccine lymph to protect against sheep pox.

(2) Revaccination as a test of immunity to Smallpox.

The outbreak of smallpox in Glasgow in May and June 1942 has once more emphasized how little is known as to the degree and duration of resistance which vaccination produces to smallpox and and the end of an accurate method for measuring such resistance. In the hope of throwing some light on the subject a series of revaccinations was carried out, using in parallel a standard vaccine lymph and a suspension of elementary bodies of vaccinia of high potency prepared from sheep pulp. The use of the latter was to try and determine if it were possible to break down a residual immunity by an increased dose of virus and if so, whether one insertion of multiple insertions (up to four) were preferable. The detailed results will be published in the near future and it is sufficient to mention here the main findings.

There was clear proof that if one insertion only were employed, a higher percentage of revaccinations (vaccinoid reactions) was obtained with the more potent vaccine but if at least two insertions were made, the difference between the two vaccines was insignificant. The modern tendency is to make only one insertion, but while this method should give 100 per cent success in non-vaccinated persons, it use in revaccination may lead to fallacies. In other word persons who are really vaccinoid reactors (semi-immune) may be returned as immune reactors (complete immune). Their susceptibility to smallpox must remain a matter of inference but there is at least a possibility that such persons might be liable to infection during epidemics.

Vaccine Lymph. 2509 grms. of pulp were obtained from 63 sheep an average of 39.8 grms. per sheep.

447,650 doses were issued including 10,000 doses despatched to Aden.

YELLOW FEVER.

Reference to the yellow fever immunity surveys of the Sudan published by Findlay, Kirk and MacCallum (Ann. Trop. Med. Parasitol. 1941 Vol. 35 p. 121) shows that no immunity is recorded among children under 18 years of age in the area east of the White Nile.

In view of this a further and more extensive survey of the Southern Fung area was undertaken this year, and the sera were tested in the Yellow Fever Research Institute, Entebbe. The results are shown below. They are consistent with those of the previous surveys. A high immunisation rate for adults was found in many places, but positive sera were not obtained from children under 16 years of age, although many donors were tested. These results give no indication of any recent eastward extension of infection but on the contrary suggest a diminution in the activity of the virus within the last 16 years in this area. The following Table shows the distribution.

MOUSE PROTECTION TESTS IN SOUTHERN FUNG.

Town or Locality.	Age Group.	No. of Specimens	Sera Giving Protection		Age of Youngest Donor
			Number	per cent.	
Wisko	Children	11	1	9.1	7
	Adults	13	2	15.4	
J. Beak	Children	11	0	0	
	Adults	11	1	9.1	35
Soda	Children	7	0	0	
	Adults	19	11	57.9	25
Gebenait	Children	7	0	0	
	Adults	7	3	42.8	26
Maghaji	Children	6	0	0	
	Adults	5	4	80.0	38
Abuldugu	Children	3	0	0	
	Adults	21	11	52.4	26
Bilwara	Children	5	0	0	
	Adults	25	3	12.0	42
J. Mufwa	Children	13	0	0	
	Adults	15	7	46.6	25
J. Jum-Jum	Children	13	0	0	
	Adults	16	7	43.7	30
Boivy	Children	4	1	25.0	7
	Adults	22	5	22.4	
Bangaru	Children	9	0	0	
	Adults	13	1	7.7	46
Fazongli	Children	9	2	22.2	5
	Adults	25	11	44.0	

SUMMARY OF ROUTINE EXAMINATIONS.

Kahn Tests	7,646
Widal Reactions	1,160
Blood Cultures	677
Blood Films	870
Blood Counts (Total)	64
Cerebrospinal Fluids	161
Biochemical Tests	225
Autogenous Vaccines	7
Pathological Histology (including brains for Rabies)	678
Faeces	2,918
Urines	1,477
Throat and Nose Swabs : *C. diphtheriae* Positive	383
,, ,, ,, ,, ,, Negative	4,039
Virulence Test (*C. diphtheriae*)	5
Sputa : *M. tuberculosis* Positive	27
,, ,, Negative	124
Spleen smears (Kala azar *positive*)	5
General Bacteriological Examinations	408
Water Examinations	134

Summary of Faeces Examintaions.

B. *dysenteriae* Flexner V—Z types	83
,, ,, 103/257	1
,, Boyd Type 170	1
,, ,, ,, P274	2
,, ,, ,, P288	1
,, ,, ,, D1	4
,, Sonne	51
Mannitol Fermenters (inagglutinable with any sera)	3
B. alkalescens	3
B. shiga	56
B. ambiguum (Schmitz)	11
B. typhosum	44
B. Paratyphosum A.	2
Amoeba histolytica present (faeces)	18
Ova Present (faeces)	41
Negative	2597

Summary of Urine Examinations (Cultures).

B. typhosum isolated	28
B. paratyphosum A	1
Negative	1448

Summary of Blood Films for Parasites.

Malaria :—Benign Tertian	18
Subtertian	205
Quartan	2
Relapsing Fever	35
Negative	610

Summary of Widal Reactions.

B. typhosum	142
B. paratyphosum A	2
B. paratyphosum B	2
Br. melitensis	50
Negative	964

Summary of Blood Cultures.

B. typhosum isolated	62
B. paratyphosum A	6
Br. melitensis	2
Strep. pyogenes	27
Other organisms	20
Negative	560

TOTAL EXAMINATIONS = 21,008

Vaccines Issued during 1942.

Cholera	11,700 c.cs.
Anti-Rabic	46,875 c.cs.
T.A.B.	40,100 c.cs.
T.A.B: Endotoxoid	800 c.cs.
Staph. Aureus	325 c.cs.
Vaccine Lymph	447,650 doses

REPORT ON MEDICAL ENTOMOLOGY FOR 1942.

By Mr. D. J. Lewis.

GENERAL.

Laboratory work was continued at the Agricultural Research Institute and at the Stack Medical Research Laboratories and field work was done chiefly in the Wadi Halfa and Kosti areas. Mr. Lewis visited the Abu Simbel area of the Assuan reservoir with Dr. S. Madwar, Entomologist to the Egyptian Ministry of Health, and discussed measures against *Anopheles gambiae*; and, during leave, made a short survey of the potential mosquito vectors of yellow fever in Eritrea.

Collections received for identification numbered 170 and included several from Eritrea and Kamaran Island.

MOSQUITOES IN RELATION TO MALARIA.

The Jebel Aulia Reservoir.

Further work resulted in additional presumptive evidence that *Anopheles pharoensis* is of minor importance in the area. *A. rufipes* was found to breed in large areas of the swamps which approached their full extent for the first time.

The Northern Distribution of A. Gambiae.

Investigations were made in the Wadi Halfa area on the distribution of *A. gambiae* the occurrence of which was reported in 1941. Unless carefully checked the species breeds in residual pools when the river level is low, particularly in June. The evidence of reports of the Wadi Halfa Hospital suggests that this mosquito has existed in the area for at least 12 years. *Larvae* of *A. gambiae* and *A. multicolor* were found in the Faras basin which partially fills every year with seepage water from the Assuan Reservoir.

Khartoum.

The very high river level provided an opportunity for studying conditions in the Sunt Forest and devising improved control measures. An early fall of rain favoured the growth of the grass *Brachiaria isachne* which caused breeding in the north-east corner. Subsequently a secondary rise of the river flooded areas of wild *mulukhia* (*Corochorus olitorius*) in which Anophelines bred.

Mosquito-eating fish.

Supplies of *Gambusia* were sent to Kassala and El Obeid and to Eritrea. *Lebistes reticulatus*, introduced from Kenya in 1941, was found, like *Gambusia* to breed much faster than indigenous fish in stock ponds. It was introduced into the Gamusiya Major and Shadli canals in the Gezira Scheme.

Anopheles rivalorum.

This species closely resembles the important *A. funestus*. It was found at Hawata on the River Rahad and is now known to occur also on the Atbara above Sofi. It breeds with *A. gambiae* and, although the adults bite man near and far from water it appears to rest out of doors by day.

Training.

Considerable numbers of mosquito men and overseers were trained in anti-mosquito work.

MOSQUITOES IN RELATION TO YELLOW FEVER.

Control.

The Medical Entomologist continued to exercise general supervision over the checking of anti-Aedes work on behalf of the Director. The Headquarters Aedes Control Unit visited many parts of the country. In each area it works under the Province Medical Inspector and checks the work of the local units, the normal control being the responsibility of the province public health staff.

With regard to the possible movement of infected mosquitoes on steamers, trains etc., a female of *Taeniorhynchus africanus* was observed to travel for some hours resting on the rudder post of a Nile steamer. The use of such resting places would appear to make thorough spraying practically impossible.

Training.

Several people were trained in Aedes control, including a public health official from Eritrea.

Publication.

A paper entitled " Experimental Transmission of yellow fever by three common species of mosquitoes from the Anglo-Egyptian Sudan", By D.J. Lewis, T.P. Hughes and A. F. Mahaffy, was published in the Ann. Trop. Med. and Parasit. 36, p. 34.

Sand-Flies.

The general survey was continued on a reduced scale and Mr. Lewis visited Hawata with Dr. Kirk in December.

OTHER INSECTS.

Collections of *Simulium* identified by the late Mr. E. G. Gibbins showed that 12 species are known in this country.

A number of tsetse flies were received for determination.

REPORT ON THE WELLCOME CHEMICAL LABORATORIES FOR THE YEAR 1942.

By Dr. A. J. Henry.

The year under review has been one of great activity and much work has been carried out, in spite of the difficult working conditions arising out of the housing of the Laboratories in the temporary accommodation in Shambat to which they were moved in 1940.

The number of samples submitted for examination during the year was 1,079 as compared with 886 in 1941. Some decrease in the numbers of waters and foodstuffs has been more than offset by large increases in the numbers of medico-legal and miscellaneous drugs and in miscellaneous samples. A high proportion of these samples require the attention of qualified staff and the increase in their numbers represents a substantial increase in the amount of work which has been dealt with. The samples received were classified as follows, the corresponding figures for 1941 being also given :—

	1942	1941
Waters	122	181
Foodstuffs	224	269
Medico-legal and Miscellaneous Drugs	196	58
Mineralogical	129	150
Miscellaneous	408	228

Special investigations have occupied a prominent place in the work of the year. They include an examination of the properties of the kala-azar drug stilbamidine, an attempt to find in the Sudan a suitable alternative source of rubber, a drive to initiate the large scale production of camphor from an Ocium species and a search for a substitute for linseed oil.

WATERS.

Eighty five of those received were classed as potable waters, and included samples from Port Sudan, El Obeid and Tokar, and from various wells in other parts of the country.

FOODSTUFFS.

These include milks, alcoholic beverages and other foodstuffs. Amongst the last were forty eight samples of dura and wheat flour examined, mostly for the Army, for report as to their general condition.

MEDICO-LEGAL AND MISCELLANEOUS DRUGS.

These are subdivided into pathological (85), toxicological (39) and miscellaneous drugs (72). Thirty five of the first group were associated with ten separate poisoning cases, positive findings including one of hyoscine and two of mercury poisoning. Thirteen samples of blood serum, seven faeces and one kidney stone were examined. Twenty nine samples of urine were received in connection with the work on stilbamidine referred to later.

Most of the samples classified as toxicological were received in connection with the above cases of suspected poisoning. They included little of interest, or of importance to the cases in question.

The miscellaneous samples included fifty six bottles of morphine hydrochloride suspected of having been tampered with. Eight of them contained sodium bicarbonate instead of morphine hydrochloride.

MINERALOGICAL.

Under this heading are included coals examined for the Railways, mineral oils and a wide variety of others.

MISCELLANEOUS.

Fifty seven of these samples were received in connection with an attempt to find a local source of rubber, 137 were oil bearing seeds, cakes and vegetables oils, and 123 were methylated spirits.

INVESTIGATIONS.

The kala-azar drug stilbamidine has received a good deal of attention during the year, arising out of the toxic symptoms which were occasionally encountered. Certain properties of the drug were examined in detail and a method of estimation applicable to the body fluids was devised. Partially decomposed solutions of the compound have been examined and some of the decomposition products characterised. Part of this work has been published in the Annals of Tropical Medicine and Parasitology and the remainder has had to be discontinued for the time being.

Preliminary work on the production of camphor from Ocimum Kilumandscharcum has made excellent progress and there are good prospects of the Sudan being able not only to supply its own requirements but to produce a substantial exportable surplus as well.

In a search for a substitute for linseed oil two oils with excellent drying properties have been found. One is contained in the seeds of Ocimum Kilimandscharicum referred to above and the second in the seeds of the Nuba Mountains euphorbia, E. candelabrum.

The investigation of the possibilities of producing hyoscyamus muticus on a large scale in the Sudan has been held up by pressure of other activities and limitations of staff and accommodation.

Attempts to produce a substitute for magnesium sulphate from sea water, which at one time looked extremely promising, have had to be discontinued. The method devised works quite satisfactorily in Khartoum and yields a product admirable in every way. In Port Sudan, however, for some reason not yet elucidated, crystallisations seem to proceed differently in spite of temperatures being closely similar, and the same product is not obtained.

In collaboration with the Director of Agriculture and the Botanist, Agricultural Research Institute, a survey has been made of the various latex bearing trees and shrubs of the Sudan in an endeavour to find a satisfactory source of rubber amongst them. Efforts have not so far had any outstanding success, but it is important that all reasonable possibilities should be explored.

SUMMARY OF THE WORK CARRIED OUT BY THE SUDAN MEDICAL SERVICE IN CONNECTION WITH THE WAR.

On the outbreak of war the Sudan Medical Service with an establishment of 44 British and 68 Sudanese doctors, 12 British Public Health Inspectors and 12 Sudanese Public Health Officers had to face heavy additional responsibilities due directly or indirectly to the military situation.

A Medical Corps had to be formed at once from civil medical cadres of all grades for the Sudan Defence Force. This Corps at its commencement was small and was entirely staffed by Sudan Medical Service staff. It consisted of a Headquarters, field, base and hygiene units, and ancillary staff. Hundreds of Sudan Medical staff of all grades volunteered for service at once.

Later as the Medical Corps expanded new recruits were trained and officers from outside the Sudan were seconded to the Corps as the Sudan Medical Service was unable to provide any more staff. Nevertheless officials from the Sudan Medical Service were posted in command of S.D.F. medical units to ensure that the Sudanese other ranks and the Sudanese patients in hospital were under commanding officers who spoke Arabic fluently and understood their psychology.

British doctors and Sudan Medical Services orderlies were seconded to the British Army for service with the force which did the ground work for the Abyssinian campaign behind the Italian lines. This force was supplied with two British doctors from the Sudan Medical Service who were attached to the British Mission with the Ethiopian army later in the war.

An enormous amount of additional work was thrown on the civil hospitals and public health services by the formation of garrisons throughout the Sudan. The civil medical organisation in the Provinces undertook the hospitalisation and medical supervision of all S.D.F. units and civil hospitals in the battle areas of the Eastern Sudan acted as forward general hospitals to which the S.D.F. wounded and sick and many from other formations were admitted. Many hundreds of the S.D.F. patients were constantly sick in civil hospitals throughout the Sudan during the war. Roseires hospital should be mentioned as having done particularly effective work in the battles for Afodo and Asosa. Sudan Medical Service staff were responsible for the general public health in all military stations except Gebeit. Much additional sanitary and anti-malarial work was undertaken by the small cadres of officials and subordinate staff throughout the country. Much work was rapidly carried out by the Public Health and Laboratory Services in the military areas of the Sudan in preparation for the arrival of the British and Indian Troops. This included mosquito surveys, testing of water supplies, and selection of camp sites.

In many out-stations the medical supervision of the British and Indian military and Royal Air Force garrisons was carried out by the Sudan Medical Service and all cases requiring hospital treatment in every station in the Sudan except Khartoum and Gebeit, and Juba for a few months, were treated in civil hospitals. The hospitals along the main lines of communication were particularly affected. In Khartoum, the Civil Hospital being very near the station and aerodrome admitted cases arriving by hospital train or air who were too ill to travel further. Kassala civil hospital was filled with military patients of many races during the Keren campaign. All K.A.R. sick and wounded requiring hospital treatment and many Belgian Congo army cases were treated in the civil hospitals of the Southern Sudan, and the civil hospital ship Lady Baker was used to evacuate Belgian sick and wounded from Gambeila to Juba.

The Stack Laboratories carried out an enormous amount of routine work for the Army and Royal Air Force. For example the routine bacteriological examinations of suspect tinned foods developed into a heavy commitment, and must have saved enormous quantities of food from being destroyed. Water testing, supplying large quantities of calf lymph and rabies vaccine to troops in the Sudan and to the Middle East Forces, preparation of large quantities of glucosesaline for treatment of wounded, and typing of blood donors are examples of the kind of work carried out. The Senior Medical Research Officer co-ordinated all the military and civil laboratory work in the Sudan, and gave all the assistance required to the military laboratories. The extensive yellow fever outbreak which occurred during the war involved the Laboratories in much additional work in receiving, testing, storing and issuing yellow fever vaccine and carrying out urgent field research. kala azar assumed special military importance as the battles for the Sudan and Eritrea were fought out in the kala azar endemic areas of the Sudan, and the Stack Laboratories carried out much urgent investigation as regards cause and treatment. The Wellcome Chemical Laboratories were also involved in much additional work directly or indirectly due to the war.

Special mention should be made of the Medical Stores Section which carried out invaluable work for the S.D.F. and Ethiopian Missions in equipping hospitals and field units, and the British and Indian Armies in supplying drugs and equipment which they needed. The work involved was very great over a long period.

The Public Health Services played a considerable part in protecting the health of the Army and R.A.F. particularly the large numbers of troops who arrived during the malaria season of 1940. British and Sudanese public health staff were attached to the Army for this purpose.

The civil medical work increased enormously as a result of the war in many stations, and this was particularly the case at Port Sudan, Juba and Wadi Halfa.

The civil defence organisation involved the Medical Service in much additional work particularly the A.R.P. organisations in Khartoum, Port Sudan, Atbara and Wadi Halfa. Staff had to be supplied for A.R.P. purposes.

The responsibilities of the Sudan civil and military medical organisation were so interwoven that it was impossible for the medical organisation of the Sudan to remain in civil and military water-tight compartments. As the war went on the Sudan civil and military medical services became more and more merged and dependent on one another. It was considered that in a tropical country which is a theatre of war all the local medical resources should be pooled to ensure that the military forces obtain the maximum assistance from the experienced civil medical staff in dealing with public health and medical problems under Sudan conditions, and that the qualified personnel of the Sudan should be distributed so that everyone was fully employed and the work as evenly distributed as possible. Doctors who remained civilians were often doing more military than civil work and vice versa.

In November, 1940, the Director Sudan Medical Service became D.D.M.S. Troops in the Sudan and was responsible for all military as well as civil medical work in the Sudan, and in the same way the Assistant Director (Public Health) became Assistant Director Hygiene Troops in the Sudan, and the Assistant Director (Hospitals) became also P.M.O., S.D.F.

The military and civil medical work was thus merged under one control. For example, the military forces were supplied with large quantities of civil medical stores when they were short of certain items, particularly at the beginning of the war, and the Sudan Medical Service obtained drugs it urgently required from military sources particularly later in the war. Without this coordination and team work between all medical services it would have been very difficult to safeguard the health of the troops or to maintain the public health of the Sudan.

The Sudan owes much to the assistance and co-operation of the Medical Directorate G.H.Q. Middle East Forces in maintaining the efficiency of the civil hospital and health services of the Sudan. British military hospital staff were provided to help in the civil hospitals in periods of stress and emergency, medical stores urgently required were always forthcoming if available, and every assistance possible was given when needed by the Hygiene and Pathology Departments in solving the urgent and difficult health, epidemiological, and laboratory problems which arise in a tropical country in time of war.

As the war moved away from the Sudan it became possible to release the Director Sudan Medical Service for civil duties and in April, 1943, he reverted to civil work. The P.M.O., S.D.F. then became A.D.M.S. Troops in the Sudan and took over executive control. It was also possible to release some of the Sudan Medical Service staff for civil duties where they were very urgently needed but the senior medical administrative officers and all the Officers Commanding medical units in S.D.F. forces serving outside the Sudan were still Sudan Medical Service officials and most of the N.C.O's in Medical units were Sudan Medical Service staff.

During the period under review an average of about 25% of the British doctors of the Sudan Medical Service were entirely released for military duties and a further 25% were also commissioned in the S.D.F. or British Army because the military duties such as S.M.O. which they carried out in addition to their normal civil duties necessitated a military rank.

PROGRESS OF WORK.

CURATIVE MEDICINE.

The following figures show the number of inpatients, outpatients attendances, and operations performed during the last twelve years:—

YEAR.	Inpatients.	Outpatient Attendances.	Operations Performed.
1931	59,736	4,044,439	6,798
1932	59,642	4,264,412	7,287
1933	70,315	5,092,999	8,609
1934	85,990	6,039,197	10,082
1935	89,093	6,112,303	11,124
1936	96,081	6,500,441	11,229
1937	101,088	6,675,989	12,063
1938	104,366	6,989,990	11,439
1939	105,103	7,119,973	11,253
1940	104,422	6,649,335	11,139
1941	103,023	6,330,711	10,417
1942	114,837	6,750,329	11,353

The standard of work has been well maintained by the denuded cadres of civil doctors and subordinate staff in the face of considerable difficulties and the general strain of war.

Restricted transport, rigid economy in drugs and equipment, additional military commitments in civil hospitals, overworked staff, and lack of leave affected the standard of medical work adversely, and it is to the credit of all concerned that there has not been more deterioration in standards due to the war.

PREVENTIVE MEDICINE.

The development of the public health services and the training of Sudanese public health personnel have continued normally. The war has thrown an enormous amount of additional work on the public health services and training has had to be carried on as fast as possible. Air quarantine, yellow fever control and the protection of military units in the Sudan were the main additional public health responsibilities. The development of the Graphic Museum continues and it has proved most useful to the military health services. The school medical and dental services were maintained as usual.

RESEARCH.

Investigations were carried out on kala-azar, glandular fever, bacillary dysentery, yellow fever and vaccine lymph, and field work was undertaken by the Medical Entomologist in the Kosti and Wadi Halfa areas.

TRAINING.

Training was carried out of the following categories of staff:—

Hospitals.	*Public Health.*	*Laboratories.*
Medical Officers	Public Health Officers	Laboratory Assistants.
Dispensers	Sanitary overseers	
Asst. Radiographers	House to house Inspectors	
Medical Assistants	Mosquito men	
Hospital Orderlies	Midwives	
Female Nurses		

Medical Officers are trained in the Kitchener School of Medicine and School of Science where they undertake a six year course of study.

Up to date this has been followed by two years as a House Surgeon or House Physician at one of the Khartoum or Province Headquarter hospitals. It was found in practice that better experience was gained in the teaching hospitals of Khartoum and Omdurman than in Provincial hospitals where the staff are often too busy or not numerous enough to direct the work of the young doctors or to ensure that their work is restricted to the work house-men should do.

At the end of the year arrangements were made for all newly qualified doctors to work for two years as housemen in the Khartoum and Omdurman Hospitals. During this time they will work as House Physicians or House Surgeons to the Medical, Surgical, Obstetrical, or Ophthalmological Departments of these hospitals.

DISPENSERS' COURSE.

The student who was referred in December 1941 was re-examined in June 1942 and successfully passed the examination. Six new students were enrolled in October.

MEDICAL ASSISTANTS' COURSE.

11 students completed the course and all were successful in their examinations. The examinations consisted of written papers and a clinical viva which included war work, laboratory and a dispensary practice and public health. Special emphasis was laid on the early detection of epidemic diseases and the sanitation of villages.

NURSES TRAINING SCHOOL.

This most important institution has been reorganised in the hope of attracting a better educated type of female recruit. The training of an efficient subordinate nursing service is one of the most difficult and most important tasks of the Sudan Medical Service. 17 female nurses were selected for training and 12 were discharged as unsuitable. Four sat for the final examination after a two year course, of whom two passed.

LABORATORY ASSISTANTS.

Four Sudanese Laboratory Assistants were trained during the year, making a total of 33.

PUBLIC HEALTH OFFICERS	See page 18.
SANITARY OVERSEERS	See page 18.
MIDWIVES	See page 27.

KITCHENER SCHOOL OF MEDICINE.

ANNUAL REPORT 1942.

By Dr. J. S. Aldridge.

GENERAL.

During 1942 there were 28 students in residence. The course taken by them has not been affected by the war and remains the same as in 1941 namely one and a half years in the School of Science and four and a half years in the School of Medicine.

NUMBER OF MEDICAL STUDENTS.

School of Science	8
School of Medicine.	
Preclinical Class	9
Junior Clinical Class	4
Senior Clinical Class	7

PROGRESS OF CLASSES.

Examinations held :—

School of Science.

Biology, Chemistry and Physics.

School of Medicine.

Anatomy and Physiology.
Pharmacology.
Public Health and Pathology.
Medicine, Surgery and Obstetrics.

SCHOOL OF SCIENCE EXAMINATIONS.

Two students reached the required standard in the final examinations and were accepted as medical students. They will commence their studies with the next preclinical class which begins in September, 1943.

SCHOOL OF MEDICINE EXAMINATIONS.

May Examinations.

Anatomy and Physiology including Histology and Embryology.

Four students were examined and reached the required standard. They proceeded to their clinical courses.

The examiners were :—

Anatomy	Dr. J. S. Hovell, F.R.C.S.E., M.R.C.O.G.
Physiology	Dr. D. R. MacDonald, M.B., Ch.B.

Public Health Special Examinations.

One student was examined and reached the required standard.

Dr. N. L. Corkill, M.D., CH.B., was the examiner in Public Health.

Pathology Special Examination.

Two students were examined and one reached the required standard.

Dr. R. Kirk, M.D., F.R.E.P.S.G., D.P.H., was the external examiner in Pathology and Dr. E. S. Horgan, M.D., B.CH., B.A.O., was the internal examiner.

DECEMBER EXAMINATIONS.

Anatomy and Physiology Including Histology and Embryology.

Nine students were examined and reached the required standard. They will proceed to their clinical courses in 1943.

The examiners were :—

Anatomy	... Col. D. Stewart, R.A.M.C., D.SC. Kaim. F. Bartholomew Bey, F.R.C.S.E.
Physiology	... Dr. R. Kirk, M.D., F.R.E.P.S.G., D.P.H.

Pharmacology and Pharmacy.

Four students were examined and reached the required standard.

Dr. D. R. MacDonald, M.B., ch.B., was the examiner in Pharmacology.

Pathology Special Examination.

One candidate who had been referred for a previous examination failed to reach the required standard at his third attempt and was asked to discontinue his studies.

Dr. R. Kirk, M.D., F.R.E.P.S.G., D.P.H., was the examiner in Pathology assisted by Dr. J. S. Aldridge, M.R.C.S., L.R.C.P.

Final Examinations in Medicine, Surgery and Obstetrics.

Six candidates presented themselves for examination in the final examinations.

Five candidates were recommended for the School Diploma and one was referred for three months in Surgery.

The successful candidates in order of merit were :—

Anis Mohamed Ali.
Mahmud Hussein Mahmud.
Mohamed El Fatih Abu Bakr.
Hassan Musa.
Mekki El Sheikh.

The examination was carried out under the supervision of a Visitor appointed by the Royal Colleges of Physicians and Surgeons who this year was Brigadier W. H. Ogilvie, R.A.M.C., M.D., M.C.H., F.R.C.S.

The examiners were :—

Medicine ...	... Col. W. Brockbank, R.A.M.C., M.D., F.R.C.P.
Surgery ...	... Kaim. F. Bartholomew Bey., F.R.C.S.E.
Obstetrics	... Dr. R. M. Humphreys, D.M.

SCHOOL PRIZES.

The following prizes were awarded :—

ANATOMY.

May Examination	The Anatomy Prize was not awarded.
December Examination	The Anatomy Prize was awarded to Mohamed El Hassan Abu Bakr.

PHYSIOLOGY.

May Examination	The Physiology Prize was awarded to Mohamed Mahmoud.
December Examination	The Physiology Prize was awarded to Abdulla Sid Ahmed Goreish.

PHARMACOLOGY.

December Examination	The Pharmacology Prize was awarded to Girgis Ayad.

OPHTHALMOLOGY.

May Examination	The King Farouk Prize in Opthalmology was awarded to Mahmud Hussein Mahmud.

MEDICINE.

December Examination	The Jackson Prize in Medicine was awarded to Anis Mohamed Ali.

SURGERY.

December Examination	The Waterfield Prize in Surgery was awarded to Mahmud Hussein Mahmud.

OBSTETRICS.

December Examination	The Jackson Prize in Obstetrics was awarded to Mohamed El Fatih Abu Bakr.

POST GRADUATE COURSE.

No Post Graduate Course was held during the year.

TEACHING STAFF.

Miss A. V. Butcher, Lecturer in Nursing, resigned on leaving the Country and Miss F. K. Quinlan was elected in her place.

LIBRARY.

Fifty five new books were added to the library which now contains 1,455 volumes. During the year 447 books were lent to civil and army practitioners and students.

STUDENTS' HOSTEL.

The hostel is part of the School and all the students are in residence.

HEALTH.

All students are examined medically at the beginning of each year. No serious illness was encountered during the year and the only adverse comment was that the students showed a loss of weight. Following this report the Medical Officer of Health reviewed the diets but found them satisfactory.

GAMES.

Facilities for tennis, football and netball are provided in the School grounds.

MISSIONS.

The following table shows the work carried out by Medical Missions :—

	Inpatients.	Outpatient Attendances	Operations.
THE CHURCH MISSIONARY SOCIETY.			
Omdurman. (Khartoum Province)	1,658	68,352	1,201
Lui (Equatoria Province)	652	94,055	160
Salara (Nuba Mountains)	262	16,010	64
Katcha (Nuba Mountains)	631	14,040	60
Juaibor (Upper Nile)	45	10,161	136
Lei (Adok)	59	6,923	—
	3307		
THE SUDAN UNITED MISSION.			
Abri	120	7,325	—
Eastern Jebels (Kordofan)			
Rom (Upper Nile Province)	5	5,015	—
THE AMERICAN MISSION.			
Nasir (Upper Nile Province)	11,860	11,860	40
Doleib Hill (Upper Nile Province)	4	26,871	—
THE SUDAN INTERIOR MISSION.			
Melut	—	517	—
Abaiyat	—	456	—

STAFF.

SUDAN MEDICAL SERVICE 1942.

APPROVED BUDGETARY ESTABLISHMENT OF CLASSIFIED OFFICIALS.

Appointment.	Establishment
Headquarters.	
Director	1
Assistant Director (Public Health)	1
Assistant Director (Hospitals)	1
Superintendent	1
Staff Clerk	1
Clerks	21
Head Accountant	1
Accountant	1
Book-keepers	13
Controller of Medical Stores	1
Medical Storekeeper	1
Storekeepers	9
Hospitals.	
Senior Physician	1
Senior Surgeon	1
Gynaecologist	1
Ophthalmologist	1
Province Medical Inspectors	8
Senior Medical Inspectors	22
Medical Inspectors	10
Medical Registrar	1
Surgical Registrar	1
Obstetrical Registrar	1
Assistant Ophthalmologist	1
Medical Officers	66
Medical Assistants	309
Matron	1
Matron, Nurses Training School	1
Charge Sisters	6
Nursing Sisters	10
Radiographer	1
Assistant Radiographers	6
Pharmacists	2
Dispensers	5
Dispensers under training	3
Book-keepers	57
Clerks	4
Southern Storekeepers	2
Head Hospital Orderlies	30
Theatre Attendants	22
Carried forward	625

Appointment	Establishment
Brought forward	625
Public Health.	
Medical Officer of Health	1
Assistant Medical Officer of Health	1
Chief Public Health Inspector	1
Senior Public Health Inspectors	10
Public Health Officers	16
Public Health Overseers	96
Principal, Midwives Training School	1
Charge Sister	1
Staff Midwives	2
Staff Nurse	1
Clerks	2
Research.	
Stack Medical Research Laboratories.	
Assistant Director (Research)	1
Senior Medical Research Officer	1
Bacteriologist	1
Assistant Bacteriologist	1
Laboratory Assistants (British)	4
Laboratory Assistants (Sudanese)	38
Laboratory Attendants	2
Clerks	3
Medical Entomology.	
Medical Entomologist	1
Technical Assistants	5
Wellcome Chemical Laboratories.	
Government Analyst	1
Chemists	1
Technical Assistants	5
Junior Technical Assistants	2
Clerk	1
Kitchener School of Medicine.	
Registrar	1
Library Clerk	1
Graphic Museum.	
Assistant Curator	1
Museum Attendants	2
TOTAL	828

FINANCIAL.

The following figures show the actual Revenue and Expenditure of the Sudan Medical Service for the last four years :—

	1939	1940	1941	1942
	£E.	£E.	£E.	£E.
1. Revenue	41,954	42,210	79,180	80,951
2. Expenditure :				
Chapter 1. Personnel and Personal Allowances	175,562	174,335	167,329	182,682
Chapter 2. Services	106,382	90,910	129,108	136,887
Chapter 3. Extraordinary Expenditure	3,787	1,839	3,135	2,813
TOTAL .... £E.	285,731	267,084	299,572	322,382

TABLE I.

ADMISSIONS AND DEATHS.

BY DISEASES.

	Darfur		Equatoria		Gezira		Kassala		Khartoum		Kordofan		Northern		Upper Nile		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
1. T. B. Pulmonary	13	4	101	16	144	27	107	15	130	39	64	20	105	11	21	5	685	137
2. T. B. Non-Pulmonary	27	7	44	3	117	8	44	1	25	—	67	6	53	3	19	2	396	30
3. Syphilis	5,151	7	4,706	6	804	11	381	1	389	2	4,954	9	385	—	910	—	17,680	36
4. Gonorrhoea	240	1	934	3	470	1	356	—	431	—	436	3	314	1	310	—	3,491	9
5. Soft Sore	76	—	23	—	56	—	39	—	36	—	63	—	21	—	16	—	330	—
6. Trachoma	128	—	848	—	84	—	27	—	48	—	82	—	148	—	3	—	1,368	—
7. All other eye diseases	304	—	776	—	272	—	188	—	776	—	269	—	371	—	398	—	3,358	—
8. Ear	50	—	143	2	54	—	10	—	33	—	90	—	16	—	17	—	413	2
9. Skin	182	2	832	1	209	3	97	—	239	—	517	2	160	—	89	1	2,325	9
10. Wounds and other injuries ...	2,067	19	6,512	55	2,096	46	1,394	30	978	15	3,416	50	1,189	17	581	10	18,233	242
11. Tumours Malignant	25	6	14	1	51	10	13	3	65	11	48	5	17	3	3	1	236	40
12. Tumours Non-Malignant ...	111	—	60	1	93	—	38	—	95	—	49	—	25	—	22	—	493	1
13. Gynaecological	24	1	32	—	195	1	77	2	302	3	128	3	110	—	27	2	895	12
14. Confinements	18	—	29	1	122	10	73	2	274	14	91	7	70	5	17	2	694	41
15. Poisoning	22	1	15	—	64	4	22	1	8	1	6	—	13	—	1	—	151	7
16. Ancylostomiasis	7	—	1,855	32	34	—	19	—	14	—	3	—	67	—	69	1	2,068	33
17. Bilharziasis	68	—	715	15	199	4	13	—	42	—	333	1	105	—	43	—	1,518	20
18. Blackwater Fever	1	1	4	2	5	2	1	—	2	—	4	1	2	1	1	—	20	7
19. Dysentery, Amoebic	822	6	545	16	345	27	436	5	227	3	534	21	278	—	160	13	3,347	91
20. Dysentery, Bacillary	2	1	22	5	33	3	24	—	39	1	56	4	5	—	—	—	181	14
21. Filariasis	8	—	52	3	2	—	—	—	2	—	4	—	—	—	1	—	69	3
22. Madura disease	20	—	1	—	108	—	18	—	64	—	45	—	27	—	1	—	284	—
23. Malaria	489	1	771	6	2,693	28	658	3	1,368	17	1,868	15	906	11	640	7	9,393	88
24. Leishmaniasis	14	6	72	5	193	53	58	16	9	3	1	1	1	—	46	20	394	104
25. Trypanosomiasis	—	—	109	3	—	—	—	—	—	—	—	—	—	—	—	—	109	3
26. Yaws	7	—	3,411	6	3	—	—	—	—	—	—	—	—	—	91	—	3,518	6
27. Heat Stroke	—	—	—	—	1	—	—	—	—	—	—	—	1	—	—	—	2	—
28. Guinea Worm	21	—	524	1	10	1	5	—	—	—	150	—	—	—	50	—	760	2
29. Tropical Ulcer	362	—	2,937	3	192	—	40	—	12	—	927	1	—	—	179	—	4.649	4
30. Anthrax	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
31. Cerebrospinal Meningitis ...	2	2	583	66	14	7	4	1	55	13	17	11	5	1	—	—	680	101
32. Chickenpox	35	—	38	—	59	—	39	—	67	—	166	—	53	—	74	—	531	—
33. Dengue	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
34. Diphtheria	—	—	—	—	7	2	17	1	23	3	8	3	17	2	1	—	73	11
35. Enteric Fever	1	1	10	1	36	1	12	2	84	11	3	—	52	3	4	1	202	20
36. Erysipelas	1	—	1	—	10	—	1	—	—	—	4	1	3	—	—	—	20	1
37. Gastro enteritis of children ...	2	2	18	5	5	2	11	3	23	3	35	4	2	1	10	1	106	21
38. Influenza	101	1	123	—	9	—	53	1	54	—	124	1	86	—	23	—	573	3
39. Leprosy	7	2	126	10	33	—	9	—	23	—	48	2	5	1	12	—	263	15
40. Undulant Fever	—	—	—	—	18	1	4	—	1	—	2	—	1	—	3	—	29	1
41. Measles	20	—	315	2	53	—	10	—	10	—	196	2	16	—	109	1	729	5
42. Mumps	117	—	4	—	43	—	49	—	8	—	117	—	12	—	3	—	353	—
43. Pellagra	—	—	—	—	—	—	1	—	—	—	1	—	—	—	—	—	2	—
44. Puerperal Fever	4	—	2	—	10	—	2	—	1	—	6	—	4	2	—	—	29	2
45. Phlebotomus Fever	13	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	13	—
46. Pneumonia	101	20	348	44	374	44	204	36	229	54	171	42	162	25	44	5	1,633	270
47. Rabies	14	1	—	—	4	4	2	—	1	1	1	1	2	1	1	—	25	8
48. Relapsing Fever	46	6	—	—	256	20	117	6	102	3	72	8	21	—	—	—	614	43
49. Acute Rheumatism	103	—	12	1	18	1	50	—	29	1	37	—	49	1	5	—	303	4
50. Smallpox	39	5	1	—	7	—	—	—	2	—	2	1	—	—	—	—	51	6
51. Tetanus	2	1	1	—	9	2	1	—	4	—	3	2	—	—	3	1	23	6
52. Whooping Cough	3	—	1	—	16	1	1	—	14	1	29	1	3	—	—	—	67	3
53. Circulatory System	67	11	277	9	207	24	133	22	259	36	160	19	137	12	15	4	1.255	137
54. Respiratory System	119	2	915	26	598	31	373	3	439	11	782	50	334	9	188	7	3,748	139
55. Alimentary System	283	14	921	35	1.069	92	401	19	874	38	1.252	53	505	13	201	19	5,506	283
56. Genito-Urinary Sytem ...	82	5	281	—	373	19	157	11	283	19	345	23	191	15	41	—	1,753	92
57. Nervous System	31	3	65	4	100	15	50	4	102	7	101	7	64	1	18	1	521	42
58. Scurvy	1	—	2	—	151	6	10	—	1	—	20	—	—	—	4	1	189	7
59. Diabetes	3	—	4	—	35	3	11	—	86	—	12	3	27	2	1	1	179	9
60. Fever of uncertain origin ...	102	6	349	1	428	23	369	17	247	9	96	10	194	5	18	—	1,803	71
61. All other diseases	334	8	2,536	26	808	14	558	22	855	47	621	11	429	3	629	1	6.770	132
TOTAL	11,892	153	33,020	416	13,399	551	6,787	227	9,484	366	18,636	404	6,763	149	5,122	107	105,103	2.373

TABLE II.

OUT-PATIENTS

NEW CASES BY DISEASES

and

TOTAL ATTENDANCES.

	Darfur	Equatoria	Gezira	Kassala	Khartoum	Kordofan	Northern	Upper Nile	TOTAL
1. T. B. Pulmonary	44	56	234	151	209	62	252	26	1,034
2. T. B. Non-Pulmonary	168	19	121	122	56	67	44	41	638
3. Syphilis	16,089	5,335	12,782	4,871	3,740	20,895	3,683	11,484	81,879
4. Gonorrhoea	872	1,341	2,473	2,446	1,609	1,700	971	839	12,251
5. Soft Sore	654	33	422	695	277	307	4,269	206	6,863
6. Trachoma	3,985	5,081	32,592	16,937	17,917	3,426	37,919	901	118,758
7. All other eye diseases	6,087	19,161	43,673	19,468	21,822	17,137	28,870	9,318	165,536
8. Ear	1,727	5,158	11,685	7,173	5,555	5,256	8,524	1,512	64,590
9. Skin	6,864	16,119	8,521	2,846	3,159	14,318	8,812	3,495	64,134
10. Wounds and other injuries	23,265	95,774	146,556	89,579	119,531	59,999	43,712	10,905	589,321
11. Tumours Malignant	66	—	204	100	156	52	32	9	619
12. Tumours Non-Malignant	900	25	3,776	1,101	1,460	401	657	94	8,414
13. Gynaecological	25	4	348	186	1,370	295	228	28	2,484
14. Confinements	4	4	74	27	366	52	296	23	846
15. Poisoning	21	23	95	—	62	10	19	5	235
16. Ancylostomiasis	322	2.379	45	46	39	7	625	70	3,533
17. Bilharziasis	658	857	1,764	125	1,002	3,425	2,343	100	10,274
18. Blackwater Fever	4	4	1	2	2	2	1	1	17
19. Dysentery, Amoebic	2,434	1,361	8,016	3,918	2,856	2,559	3,872	1,276	26,292
20. Dysentery, Bacillary	41	—	400	278	384	153	253	—	1,509
21. Filariasis	3	48	3	1	—	4	—	1	60
22. Madura disease	10	20	720	26	98	29	18	1	922
23. Malaria	4,012	5,764	56,830	9,237	11,606	30,449	16,863	4,660	139,421
24. Leishmaniasis	9	108	1,723	22	9	3	—	47	1,921
25. Trypanosomiasis	—	56	—	—	—	—	—	—	56
26. Yaws	279	23,309	—	—	—	4	—	417	24,009
27. Heat Stroke	—	—	34	—	—	—	4	—	38
28. Guinea Worm	287	2,368	297	6	—	470	—	168	3,595
29. Tropical Ulcer	1,096	19,148	781	1,043	15	3,242	189	3,504	29,012
30. Anthrax	—	—	—	—	—	—	—	—	—
31. Cerebrospinal Meningitis	1	236	55	4	18	15	3	2	334
32. Chickenpox	67	14	168	31	83	234	157	92	846
33. Dengue	4	—	—	—	1	—	—	—	5
34. Diphtheria	4	—	6	27	18	6	8	4	73
35. Enteric Fever	1	—	—	3	36	—	27	10	77
36. Erysipelas	—	—	1	2	11	3	7	—	24
37. Gastro enteritis of children	228	326	1,064	192	2,189	893	1,071	44	5,907
38. Influenza	1,083	1,155	1,835	2,396	2,183	233	1,923	53	10,861
39. Leprosy	72	251	78	8	13	124	6	18	570
40. Undulant Fever	—	—	3	1	1	1	—	3	9
41. Measles	36	346	1,050	74	319	663	763	282	3,633
42. Mumps	261	12	736	172	765	293	502	27	2,768
43. Pellagra	—	—	—	4	—	4	—	—	8
44. Puerperal Fever	1	—	40	41	22	7	55	1	131
45. Phlebotomus Fever	—	—	16	92	1	—	46	—	155
46. Pneumonia	153	206	1,101	321	376	287	804	97	3,345
47. Rabies	17	—	26	51	7	10	5	3	119
48. Relapsing Fever	43	—	457	81	116	15	220	—	932
49. Acute Rheumatism	585	92	1,099	1,561	1,465	301	1,558	107	6,768
50. Smallpox	76	—	11	—	6	3	—	2	98
51. Tetanus	1	—	2	—	2	2	—	3	10
52. Whooping Cough	25	74	1,239	212	1,226	544	853	59	4,232
53. Circulatory System	141	92	2,086	1,902	1,623	1,023	1,636	275	8,778
54. Respiratory System	6,944	42,039	42,336	28,390	14,353	29,131	31,976	5,167	200,336
55. Alimentary System	18,127	22,278	65,621	36,296	25,805	36,993	47,444	5,110	257,674
56. Genito-Urinary System	1,689	57	7,251	1,533	2,092	2,055	2,285	83	17,045
57. Nervous System	39	14	3,478	1,702	1,464	1,157	3.212	220	11.286
58. Scurvy	1	—	403	61	7	37	26	60	595
59. Diabetes	2	1	816	45	94	27	128	—	1,113
60. Fever of uncertain origin	1,592	2,364	20,208	7,641	6,553	4,240	7,734	998	51,330
61. All other diseases	9,410	15,981	113,814	23,643	28,767	15,608	32.098	4.555	243,876
Total New Cases	110,529	289,178	599,170	269.856	282,918	258,234	297.003	66,406	2,173,294
ATTENDANCES: MEN	155.827	378.645	689,358	422,274	300,701	447,590	408,195	90,022	2,892,612
WOMEN	74,684	174,572	270,842	94,934	192,895	231,357	244,069	50,364	1.333,717
CHILDREN	90,164	193,633	434,841	160,769	237,089	380,301	536.428	57,859	2,091,084
ATTENDANCES: DRESSING STATIONS	—	254,594	—	74,069	197.523	—	240.374	—	766,560
Total Attendances	320,675	1,001,444	1,395,041	752,046	928,208	1,059,248	1,429,066	198.244	7.119,973

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